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Journal of the Society of Arts.

FRIDAY, DECEMBER 6, 1861.

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VISIT OF THE SOCIETY TO THE EXHIBITION BUILDING.

By the courtesy of Messrs. Kelk and Lucas, the contractors for the building now in course of erection for the International Exhibition of 1862, the members of the Society of Arts were invited to inspect the works, on Saturday last, the 30th ult. Each member had the privilege of introducing a friend, and, notwithstanding the unfavourable state of the weather, about one thousand persons were present.

Lieut. Brooke, R.E., who has been for some time past engaged in assisting the architect, Captain Fowke, R.E., in the superintendence of the works, kindly accompanied the Chairman of the Council and other members over the building, explaining its most interesting features.

This visit was arranged principally with the view of giving additional interest to the paper read by Captain Phillpotts, R.E., at the meeting on Wednesday evening.

Those members who were prevented from visiting the building on Saturday last, can use their cards of admission on any subsequent Saturday afternoon previous to the 1st of February, 1862.

INTERNATIONAL EXHIBITION OF 1862.

The Council beg to announce that the Guarantee Deed is now lying at the Society's House for signature, and they will be much obliged if those gentlemen who have given in their names as Guarantors, as well as others interested in the Exhibition, will make it convenient to call there and attach their signatures to the Document. Signatures for sums amounting in the aggregate to £440,250, have been attached to the Deed.

WEEKLY PROGRESS OF THE INTERNATIONAL EXHIBITION.

The Thames Iron Company are proceeding rapidly with the Eastern Dome, but their exertions seem to have stopped their operations on the Northern Courts, the roofs of which they have contracted to fix. It is not clear why they do not employ twice the number of hands. As respects the Western Dome, the contractors have taken the matter up so energetically, that they speak very confidently of the work being completed at the time appointed for the delivery of the building into the hands of the Commissioners. The forests of timber conceal the real progress of the domes, and until these are quite finished, the scaffolds cannot be removed. The contractors are making preparations to work by gas light. The glazing of the south courts is making the utmost progress, and will be finished in a few days, but some delay in the glazing may occur in reference to the northern courts, unless the iron work goes on more rapidly.

In all other respects the works are proceeding with an activity that promises an easy fulfilment of the contract. The plastering of the Picture Gallery east of the entrance will be completed this week, and it is fully expected that the whole of the scaffolding will be removed from the Picture Galleries before Christmas.

The late rains have rendered the state of the ground very dirty, but the drainage, which was necessarily delayed till all the heavy ironwork was brought in and fixed, has now been commenced, and will be finished in a few days.

The flooring of the ground floor is about to be commenced in some parts, but it may be doubtful if it should be carried throughout the whole building until after the heavy goods of the Exhibition have been brought in and the foundations made. A great amount of damage was done to the floor in 1851 by the reception of goods, and also in Paris in the "annexe." The reception of goods does not commence until the 1st of March, and it will therefore rest with the Commissioners to say if they will have the whole floor laid by the 12th of February, the day for delivering up the building.

The refreshment contracts have been given in two blocks, the one to Mr. F. E. Morrish, of Liverpool, and Mr. W. Sanders, late of the Great Western Hotel; the other to M. Veillard, of 59, Mark-lane, and M. Martin, of Paris, supported by MM. Valentin, the great wine merchants, in that city. There are two separate contracts. Although they vary somewhat in their details, the principle adopted is the same in both, of paying a per centage on the visitors. Both contractors pay down a premium. Besides, in the French contracts, it is said that the contractors will pay ½d. per visitor on the first four millions of visits, and a farthing upon all exceeding that number. The English contractors, it is said, are to pay something like five-eighths of a penny on every visitor. It is estimated that, should the numbers be the same as in 1851 (about six millions) the funds of the Exhibition will receive about £30,000. It forms no part of the contract with Messrs. Kelk and Lucas that the refreshment rooms should be delivered up on the 12th of February, but they are making arrangements to complete the works as soon after that date as possible.

The following additional arrangements have been made :—

Her Majesty's Commissioners have requested the Earl of Caithness; E. Kater, Esq., F.R.S.; and Hugh Diamond, Esq, M.D., to act as a Committee in connection with the Photographic Department.

Rome.

A Commission has been appointed here, consisting of the following members:—Sua Excellenza il Signor Principe Aldobrandini, Presidente:—

Sig. Cav. Luigi Tosi, Sostituto del Ministero; Sig. Cav. Luigi Grifi, Segretario-Generale del Ministero e Segretario della Commissione; Sig. Cav. Tommaso Minardi, Ispettore delle pitture pubbliche di Roma; Sig. Commend. Pietro Ercole Visconti, Commissario dell Antichità di Roma; Sig. Commend. Pietro Tenerani, Direttore dei Musei, Gallerie Pontificie; Commend. Luigi Paletti Cattedratico di Architettura nell' Accademia di S. Luca; Sig. Commend. Clemente Falchi, membro emerito, del Consiglio d'Arte; Sig. Cav. Francesco Podesti, Cattedratico di pittura nell' Accademia di S. Luca; Sig. Cav. Gio. Batt. De Rossi, membro della Commissione Consultiva di Antichità e belle Arti; Sig. Conte Virginio Vespiniani, membro della Commissione Consultiva, di Antichità e belle Arti; Sig. Prof. Niccola Cavalieri S. Bertolo, membro del Consiglio di Arte; Sig. Presidente della Primaria Camera di Commercio di Roma; Sig. Vice-Presidente, idem; Sig. Giuseppe Gigli, membro della Commissione di Agricultura; Sig. Prof. Clemente Jacobini, idem; Sig. Cav. Gioacchino Albertazzi, idem di Commercio; Sig. Cav. Luigi Vescorali, idem d'Industria; Sig. Prof. Francesco Ratti, idem; Sig. Prof. Giuseppe Ponzi, idem.

THIRD ORDINARY MEETING.

Wednesday, Dec. 4th, 1861.

The Third Ordinary Meeting of the One Hundred and Eighth Session was held on Wednesday, the 4th inst., Henry Thomas Hope, Esq., Vice-President of the Society, in the chair.

The following candidates were proposed for election as members of the Society:—

Anstie, Alfred	55, Lincoln's-inn-fields, W.C.
Beeton, S. O.	248, Strand, W.C.
Birkin, Richard, jun.	Nottingham.
Clarke, Robert, G.	St. Alban's-road, Highgate, N.
Cutler, Joseph Horatio	New Town-row, Birmingham.
Devey, Joseph	Lewes, Essex.
Dixon, George	Broad-street, Birmingham.
Dunning, Joseph Wm.	1, Field-court, Gray's-inn, W.C.
Finlayson, John Sterling Hamilton Bruce	14B, Weymouth-street, Portland-place, W.
Frauenknecht, Oscar	Bangor House, Shoe-lane, E.C.
Hanrote, Philip Augustus	8, Ladbroke-square, Notting-hill, W.
Horton, Isaac	New Park-st., Borough, S.E., and 16, Clapham-rise, S.
Hunter, Edward	The Glebe, Blackheath, S.E.
Jackson, Edward E.	49, Rathbone-place, W.
Lamb, George	Worting, near Basingstoke, Hants.
Lea, John Wheeley.	68, Broad-street, Worcester
Manning, John	Nottingham.
Payne, Joseph	Highgate, N.
Reid, John	5, Langford-place, Lansdown-road, St. John's-wood, N.W,
Scott, Charles A.	24, Ely-place, Holborn, E.C.
Underdown, Emanuel Maguire	Gray's-inn-square, W.C.
Vaughan, Henry	28, Cumberland-terrace, Regent's-park, N.W.
Waugh, Edgar Weller	3, Goodge-street, W.
Williams, Thomas	Pembridge-gardens, Bayswater, N.
Yeo, Frank Ash	Belvoir-villas, St. Helen's-road, Swansea.

The following candidates were balloted for and duly elected members of the Society:—

Adams, Thomas	Lenton Firs, near Nottingham.
Adcock, Wm. Thompson.	Worcester.
Ainslie, Wm. George	Ford House, Ulverston.
Alcock, Henry	36, Stockwell-park-road, S.
Atkin, Harry Wright	39, Ely-place, Holborn, E.C., and Truro Works, Sheffield.
Austin, George	7, London-street, E.C.
Baily, John Walker	71, Gracechurch-street, E.C.
Baker, William	Euston Station, N.W.
Banbury, Frederick	46, Westbourne-park-road, W.
Barnes, John Hickman	6, Fitzroy-square, W.
Barrett, Henry	Beech-street, Barbican, E.C.
Barrow, Wm. Hodgson, M.P.	Nottingham.
Bass, Michael Arthur	Burton-upon-Trent.
Batters, George	8, Elm-grove, Peckham-rye, S.E.
Bazalgette, John Van Norden	1, Delahay-street, Westminster, S.W.
Beale, Willert	28, Grosvenor-street, W.
Beisly, Sidney	The Cedars, Laurie-park, Sydenham, S.E.
Bellamy, Alan Charles Bruce	10, Cornhill, E.C., and Streatham, S.
Belt, Thomas	Ryton, near Newcastle-on-Tyne.
Bennett, John	50, Westbourne-park-villas, Bayswater, W.
Bentall, Edwd. Hammond	Heybridge, near Maldon, Essex.
Benyon, Richard	34, Grosvenor-square, W., and Englefield House, Reading.
Berners, Lord	Keythorpe Hall, Leicester.
Birkbeck, George H.	34, Southampton-buildings, W.C.
Birkin, Richard	Appley Hall, near Nottingham.
Birly, Richard	Seedley, Pendleton, Manchester.
Bischoff, James	72A, Old Broad-street, E.C.
Black, Henry, jun.	1A, Berners-street, W.
Bone, Geo.	44, Minories, E.C.
Boord, Joseph	14, Upper Hyde-park-gardens, W.
Boord, Thos. Wm.	7, Greville-road, Kilburn, N.W.
Booth, Edwin	Barnsley.
Boreham, Wm. Wakeling, F.R.A.S.	Haverhill, Newmarket.
Bradley, John	The Park, Nottingham.
Brakell, Thos.	Cook-street, Liverpool.
Breffit, Edgar	61, King William-street, E.C.
Brogden, John	4, Highbury-park North, N.
Brooke, Thos.	Northgate Mount, Huddersfield.
Brown, M. L.	47, St. Martin's-lane, W.C.
Brownfield, Wm.	Chatterly-house, Hanley, Staffordshire.
Browning, Thomas	6, Whitehall, S.W.
Brunswick, Myrthil	26, Newman-street, Oxford-street, W.
Burt, Stephen John	26, Farringdon-street, E.C.
Candy, Charles	4, 5, and 6, Watling-st., E.C. and Wellfield, Streatham.
Carstairs, Peter	The Green, Richmond, S.W.
Carter, Edwin Jones	3, Watling-street, E.C., and Upper Homerton, N.E.
Chaplin, R. J.	17, Red-cross-square, E.C.

Chapman, Wm.	Nottingham.
Chappell, Thomas	50, New Bond-street, W.
Chatteris, Henry	The Grove, Lee, Kent
Chatto, John	Royal College of Surgeons, W.C.
Clark, Hy., M.D.,	Southampton.
Clarke, Robert	London Coffee House, Ludgate hill, E.C.
Clay, Richard	Bread-street-hill, E.C.
Clennell, John Edward...	London-fields, Hackney, N.E,
Clifford, Charles	5, Hare-court, Temple, E.C.
Cobden, George Long ...	13, Leonard-place, Kensington, W.
Collard, Charles L.	Oval-road, Regent's-park, N.W.
Cooper, George Binion ..	121, Drury-lane, W.C.
Cooper, Henry	20, Moor-street, Soho, W.
Copeland, Alfred J.	Manor-house, Bushy, and 160, New Bond-street, W.
Cossham, Handel	Shortwood-lodge, near Bristol
Couchman, Henry	Elm-cottage, Lee-road, S.E.
Cowtan, Maiver	23, Sheffield-terrace, Campden-hill, W.
Collett, Charles	90, Cannon-street, E.C.
Cory, William, junr.	4, Gordon-place, W.C., and Coal Exchange, E.C.
Cox, Wm. Thos.	Spondon Hall, near Derby.
Crawley, Charles Edward	17, Gracechurch-street, E.C.
Cullingford, W. H.	7, Phillimore-gardens, Kensington, W.
Curtis, Thomas	The Hall, Berkhampstead.
Darton, J. M.	58, Holborn-hill, E.C.
Davidson, Adam	The British Linen Company Bank, Nairn.
Davies, Henry	21, Duncan-ter., Islington, N.
Davy, Charles	Gwynne House, Woodford Bridge, and 100, Upper Thames-street, E.C.
Dawson, John	New Park-road, Clapham-park, S.
Day, C. A.	Northam Iron Works, Southampton.
Deed, Martin	451, Oxford-street, W.C.
Dennett, Chas. Cotton ...	Nottingham.
Denton, Chas. Jones	5, Clarendon-terrace, Bow-road, E.
Dewsnap, W.	7, and 57, St. John's-square, E.C.
Dixon, James	22, Tavistock-square, W.C.
Dodson, Henry	Cambridge Lodge, Penge-rd., Sydenham, S.E., and 98, Blackman-st., Borough, S.
Donald, Thos. W.	69, Regent-street, W.
Dowell, Wm.	14, Bexley-place, Greenwich, S.E.
Dowie, James	455, Strand, W.C.
Driver, Henry	Windsor.
Duncan, James	Greenock.
Dunsford, Wm. James ..	14, Taviton-street, Gordon-square, W.C.
Durlacher, Alex.	15, Old Burlington-street, W.
Eborall, Cornelius Willes.	2, Lee-park, Blackheath, S.E.
Espin, John	Davies-st., Berkeley-sq., W.
Evans, E. Bickerton	Worcester.
Evans, Robert Harding ...	73, Warwick-square, Belgravia South, S.W.
Farden, Richard	5, Queen's-row, Turnham-green, W.
Farncombe, Chas.	19, Culford-road, North Kingsland, N.E.
Farrow, Chas.	18, Great Tower-street, E.C., and Holly-lodge, Wood-street, Walthamstow, N.E.
Feversham, Lord	1, Great Cumberland-st., W.
Filmer, Thos. H.	28, Berners-street, W.
Finnis, Thos. Q., (Alderman)	79, Great Tower-street, E.C.
Firmin, Geo. J.	Atlas Chemical Works, Boro'-road, S.E.
Fischer, John Phillip ...	Tower-street, E.C., and Pebble Combe, Epsom.
Fisher, Joseph Chas.	3, Cripplegate-buildings, Wood-street, E.C.
Fisher, James	Radford Works, near Nottingham.
Forster, Geo. Baker	Newcastle-upon-Tyne.
Foster, Sampson Lloyd .	The Five Ways, Walsall.
Franklyn, George Woodroffe, M.P.	Lovell-hill, Windsor.
Fuller, Wm. Moxon	Grimstone-cottage, Wolverhampton.
Fulton, J. Rennie	34, Duke-st., St. James, S.W.
Gerstenberg, Isidor	11, Warnford-court, E.C.
Glass, Thomas	24, Somerset-street, Kingsdown, Bristol.
Goode, Thomas	19, South Audley-street, W.
Goodwyn, Major-Gen. H.	4, Blomfield-terr., Harrow-road, W.
Graham, Alexander	South-fields, Wandsworth, S.W.
Graham, William	Manchester.
Grant, George	59, Oxford-street, W.
Grew, Frederick	8, Leighton-vils. Holloway, N
Gunter, Richard	East Hill, Wandsworth, S.W.
Guy, George	6, Powis-pl., Haverstock-hill, N.W.
Hallett, George	52, Broad-wall, Blackfriars, S.
Hallilay, Richard	5, Sergeant's Inn, Temple, E.C.
Halloran, Arthur B., F.R.G.S.	9, Regent-park, Heavitree, Exeter.
Hankey, Blake Alex. ...	38, Portland-place, W.
Harrison, Thos., jun., B.A.	17, Clarendon-road, Kensington, W.
Harris, James	Hanwell, W.
Harpley, Matthew John ..	Royal Regt., of Horse Guards.
Headley, Richard	Stapleford.
Hebbert, Charles	12, Ovington-terrace, Brompton, S.W.
Hely, Francis Edward ...	1, London-street, E.C.
Hemming, Fred. Shand...	Belsize-pk., Hampstead, N.W.
Hennet, Follett Charles...	Bridgewater.
Herbert, Wm. (Messrs. Symes and Co.)	33, Fenchurch-st., E.C., and Rectory Grove, Clapham, S.
Hester, John Cooks	14, Little Tower-street, E.C.
Hewett, Henry John ..	19, Alexander-square, Brompton, S.W.
Hill, James Duke	25, Coal Exchange, E.C.
Hill, Thomas Rowley ...	Catherine-hill House, Worcester.
Hindley, Chas. Hugh ...	134, Oxford-street, W.
Hinstin, Ernest	22, Milk-st., Cheapside, E.C.
Hitchcock, Frs. Maunder.	Southmolton, Devon.
Hodge, Charles	Oak-lane, Limehouse, E.
Hunt, Richard	Scarborough, Yorks.
Hutchinson, John Henry.	19, Little Pulteney-street, W.
Hutchinson, John	Appleton Lodge, Warrington, Lancashire.
Hunting, Richard	139, Regent-street, W.
Hyde, Edmund	Kingston-on-Thames, S.W.
Ingram, Alexander	Stranraer, Wigtownshire.
Ingle, Henry	102, Shoe-lane, E.C.
Jackson, Edward	Rochford Bank, Rochford.
Jacob, Edward	4, City-road, E.C.
Jarvis, John Stephen	47, Tufnell-park-road, Holloway, N.
Jellicoe, Charles	23, Chester-terrace, Regent's-park, N.W.
Jenkins, Chas. Fredk. ...	9, Sunderland-terrace, Westbourne-park, W.
Joel, Joseph	Brompton-hall, S.W.

Johnson, Charles	10, Addison-road, Kensington, W.
Jonas, Samuel Adolph	2, Bow-lane, E.C.
Jones, Edward	The Larches, Handsworth, Birmingham.
Jones, Frederick John	10, Aldermanbury, E.C.
Joske, Paul	Baron House, Mitcham, S.
Kennedy, Chas. Burton	Fairview, Ulverston.
Kennedy, Myles	Burton-cottage, near Ulverston.
Kershaw, Joseph Goodwin.	Mordon-rd., Blackheath, S.E.
Kirk, Alfred	Horncastle.
Kyle, John Joseph J.	Bogle-street, Greenock.
Lascelles, Francis	Oakhill-park, Hampstead, N.W.
Leeks, Mrs. E. F.	73, Warwick-square, S.W.
Lelean, William	21, Queen's-road West, Regent's-park, N.W.
Lennox, Lord Henry Gordon, M.P.	51, Portland-place, W.
Lethbridge, J. C.	25, Abingdon-street, S.W.
Lewenz, Ivan	23, Fenchurch-street, E.C.
Lewis, John	46, Guildford-street, Russell-square, W.C.
Loam, Matthew	Liskeard, Cornwall.
Loam, Michael, jun.	Liskeard, Cornwall.
Lock, Sam. Robt.	9, Bernard-st., Primrose-hill, N.W.
Lucas, Alfred	Luton Bank, Luton.
Lucas, James J. H.	13a, Upper Woburn-place, Tavistock-square, W.C.
Maclaren, George	5, Cursitor-street, Chancery-lane, E.C.
McCorquodale, George	Newton, near Warrington.
M'Clean, Frank	2, Park-street, Westminster, S.W.
M'Clure, William	Manchester.
McKewan, William	21, Lombard-street, E.C.
Marshall, James	11, Vere-street, Oxford-street, W.
Marston, Henry	94, Albany-street, Regent's-park, N.W.
Martin, Geo. W.	14 and 15, Exeter Hall, W.C.
Martin, Peter, J. P.	The Street, Rivington Chorley, Lancashire.
Masset, Alfred Moyse	13, Sanford-place, Stoke Newington, N.
Masson, Francis John	53, Bolsover-street, W.
May, Geo. B.	Truro.
Mayhew, Chas. Fredk.	10, Barge Yard-chambers, Bucklersbury, E.C.
Melles, William	11, Alwyne-road, Canonbury, N.
Metzler, G. T.	35, 37, and 38, Great Marlboro'-street, W.
Meyerstein, Wm.	9, Highbury-grove, N.
Miller, Geo. James	6, Great College-street, Westminster, S.W.
Morel, Victor	9a, King Edward-street, Lambeth-road, S.
Moreton, John	22, Bush-lane, Cannon-street, E.C., and Wolverhampton.
Morrish, F. E.	Lancaster-buildings, Liverpool.
Murchison, Sir Roderick I., D.C.L., F.R.S., &c.	16, Belgrave-square, S.W.
Murray, Thos.	12, Copthall-court, E.C.
Myers, Abraham Nathan .	144, Leadenhall-street, E.C.
Navroji, Dádábhái	32, Great St. Helen's, E.C.
Negroponte, Stavros J.	Edge-lane, Stretford, Manchester
Neighbour, Geo. L.	127, High Holborn, W.C.
Neilson, Walter Montgomerie	Hyde-pk. Locomotive Works, Glasgow.
Nichols, Richard Peter	25, Maida-hill West, W.
North, Thomas	Basford-hall, nr. Nottingham.

Oram, Richd. E. Sprague	1, Bellevue, Stalybridge.
Paget, Frederick	37, Old Broad-street, E.C.
Paget, Thos. Tertius	Humberstone, Leicestershire.
Palmer, George	Reading.
Pares, John	Elm-grove, Binfield, Berks and Prescott Manor, Banbury.
Parker, Henry T.	3, Ladbroke-grdns., Kensington-pk., Notting-hill, W.
Parker, James	Gt. Baddow-house, Chelmsford, Essex.
Palk, Sir Lawrence, Bart., M.P.	Haldon-house, Exeter.
Pease, Henry	Pierrepoint, Darlington.
Pease, Joseph	Southend, Darlington.
Peterkin, James Grant	Grange-hall, Forres, N.B.
Phillip, George	32, Fleet-street, E.C.
Phillips, Robt. Needham	The Park, Manchester.
Phillips, Thomas Adams	Gibson-square, Islington, N.
Phythian, T.	430, West Strand, W.C.
Pitman, Frederick	20, Paternoster-row, E.C.
Pittar, Park	16, Kensington-pk.-gdns., W.
Pocock, Samuel John	6, Woburn-place, Russell-sq., W.C.
Poole, H. G.	4, Old Burlington-street, W.
Prothero, Francis Egerton, B.A.	The Inner Temple, E.C.
Pryor, Francis	Redruth, Cornwall.
Purssell, Alfred	80, Cornhill, E.C.
Puttick, James Fell	47, Leicester-square, W.C.
Reuter, Simon	Moorgate-st. Chambers, Moorgate-street, E.C.
Reynolds, Chas., Wm.	2, Eaton-place, S.W.
Ricardo, David	Gatcombe, Minchinhampton, and 29, Piccadilly, W.
Richardson, T. Shepherd	Clapham-house, Litlington, Sussex.
Richards, Wm.	16, River-street, Myddleton-square, E.C.
Rider, Samuel C.	3, Albion-villas, Tollington-park, Hornsey-road, N.
Ringland, William	36, Wood-st., Cheapside, E.C.
Roberts, Daniel	16, Northampton-place, Old Kent-road, S.E.
Roberts, Henry	32, Arlington-street, New North-road, N.
Robinson, J. H.	The Grove, Petworth, Sussex.
Roe, George	Nutley, Dublin.
Rogerson, John	Newcastle-on-Tyne, 2, Royal Exchange-buildings, E.C., and Killingworth-house, Northumberland.
Rolls, R. H.	Banbury.
Rowland, Alexander W.	20, Hatton-garden.
Rubens, Victor	1, Angel-court, Throgmorton-street, E.C.
Rumbold, William Henry	The Grange, Tunbridge Wells.
Ryan, James, J. junr.	116, Long-acre, W.C.
Schlesinger, Julius	Walmer-villa, Bradford, Yorkshire.
Shaw, Benjamin	8, Cambridge-square, W.
Shepperson, Allen Thos.	Dulwich-hill, Surrey, S.
Sheriff, Robert French	14, Jermyn-street, S.W., and Inner Temple, E.C.
Shirreff, Geo. W.	4, Bank-chambers, E.C.
Sidebottam, Alfred	Crown-street, Camberwell, S.
Silk, Robert, junr.	8, Long-acre, W.C.
Simons, George	The Park, Nottingham.
Simonsen, Michael L.	35, Finsbury-circus, E.C.
Simpson, Wm. Fred.	456, West Strand, W.C.
Skey, George	Bonehill-lodge, Tamworth.
Smith, David	109, Fore-street, E.C.
Smith, F. Warwick	180, Upper Thames-street, E.C.
Smith, Hy. Nickison	2, Compton-road, Canonbury, N.

Smith, James	Barton-villa, Malton.
Smith, R. M.	Edinburgh.
Snelgrove, John	11, Vere-st., Oxford-st., W.
Snowden, Thomas	Stockton-on-Tees.
Sparrow, Charles E.	11, New North-street, Red Lion-square, W.C.
Sparrow, Wm. Mander	Penn-court, near Wolverhampton.
Spooner, William	Walton-lodge, Stafford.
Square, Elliot	16, Notting-hill-terrace, W.
Stenhouse, John, LL.D., F.R.S.	17, Rodney-street, Pentonville, N.
Stone, David H.	33, Poultry, E.C.
Stovin, The Rev. Charles Frederick	Leigh-hill, Cobham, Surrey.
Tansley, Alfred John	Luton, Beds.
Taylor, T. G.	10A, King's Arms-yard, E.C.
Taylor, Wm.	Sunny-field, near Braintree, Essex.
Thompson, H. Ayscough	On the Bank, Highgate, N.
Toms, Thos. Harris	Higham Lodge, Walthamstow, N.E.
Tongue, John Garrett	34, Southampton-bdgs., W.C.
Toogood, Henry	1, Chester-square, W.
Tredinnick, Richard	Mildmay-park, N., and Lombard-street, E C.
Treggon, Wm. Thos	22, Jewin-street, E.C.
Treloar, Thomas	42, Ludgate-hill, E.C.
Turner, Benj. Brecknell	31, Haymarket, S.W.
Turton, Thomas	Portwood, Stockport.
Tyler, Sir Jas.	Pine-house, Holloway, N.
Tysoe, John	Manchester.
Unna, Ferdinand.	Vernon-lodge, Addison-road, Kensington, W.
Utterton, Rev. Jno. Sutton (Archdeacon of Surrey)	Farnham, Surrey.
Vallance, H. Wellington.	3, St. George's-road, Eccleston-square, S.W.
Vallentin, James	Shearn-lodge, Walthamstow, N.E.
Waggett, John, M.D.	Stanley-terrace, Kensington-park, W.
Walker, Sir Edwd. S.	Berry-hill, Mansfield, Notts.
Walsh, David H.	Pembroke-house, Pembroke-road, Clifton, Bristol.
Wardell, Wm.	Abbotsfield, Chester.
Watkins, William	52, Lime-street, E.C.
Watson, Peter	71, Myddelton-square, E.C.
Watts, Robt.	6, Great Newport-street, W.C.
Webb, Chas. Locock	Hanover-terrace, Notting-hill, W.
Webb, George (Messrs. Symes and Co.)	33, Fenchurch-street, E.C., and 2, Middleton-road, Dalston, N.E.
Wells, George	12, North-street, Westminster, S.W.
Wheelwright, Wm., jun.	16, Upper Woburn-place, W.C.
Whitfield, Geo. C.	1, Cambridge-place, Kensington, W.
Williams, Dr. Llewellyn.	9, Leonard-place, Kensington, W.
Wilson, Chas. Edmund	5, Earl's-terrace, Kensington, W.
Wilson, Erasmus, F.R.C.S., F.R.S.	17, Henrietta-street, Cavendish-square, W.
Wilson, Robert Porter	31, Threadneedle-street, E.C.
Wilson, William	18, Ludowick-terrace, Gloucester-road, N.W.
Winsor, Wm., F.C.S.	38, Rathbone-place, W.
Woolloton, Chas.	246, Boro' High-street, S.E., and Lynton-lodge, Clapham-park, S.
Young, John, Jun.	35, King-street, E.C.; and 47, Mark-lane, E.C.

The Paper read was—

THE BUILDING FOR THE INTERNATIONAL EXHIBITION OF 1862.

By Captain William C. Phillpotts, R.E.

The records of this Society show that, in establishing the International Exhibition of 1851, it was intended it should be the first of a series of similar Exhibitions; its brilliant success confirmed the Society in this resolution, and ten years was thought to be a convenient interval between each.

Accordingly, in 1858, the idea of an Exhibition, to be held in 1861, was brought forward, and being favourably received, was resolved on. The political state of Europe, however, compelled its postponement till 1862, and a Royal Commission for carrying it out was appointed early in the present year.

The surplus funds of the 1851 Exhibition had been devoted to the purchase of a plot of ground on the Kensington-gore Estate, which was intended to aid future International Exhibitions and buildings for promoting Industrial Science and Art. Twenty-two acres of this ground have been enclosed in a large quadrangle formed by arcades, and leased by the Commissioners of 1851 to the Royal Horticultural Society to promote the objects of that Institution.

In laying out the arcades a large piece of ground was left at the south end, and the possibility of future Exhibitions not being lost sight of, they were so arranged as to make the remaining unoccupied space easily available for that object.

The southern portion of the arcades was built from the design of Captain Fowke, the engineer and architect to the department of Science and Art, who was one of a Committee appointed to superintend the construction of the whole of the works on the estate of the Commissioners of 1851. From having been Secretary to the British department of the Paris Exhibition, in 1855, he had gained a clear insight into the nature of the building best adapted to a similar Exhibition in England. Availing himself, therefore, of the experience thus gained, and acting under the conviction that periodical International Exhibitions would be established in England, he carefully considered the most appropriate design for a building on the ground adjoining the Royal Horticultural Society's Gardens. This design was matured while the arcades were in progress, and was therefore ready to be submitted to the Royal Commissioners as soon as they were appointed.

On the arrangements for the ground being completed, the Commissioners therefore had before them a design founded on a large experience and an intimate knowledge of the site, the merits of which they at once recognised. Thus relieved of the necessity of competition, which, in the case of the 1851 Exhibition, resulted in disappointment and delay, they carefully considered Captain Fowke's plans, and eventually accepted them, subject, however, to some modification on account of the cost of their execution, which was estimated at £590,000. The leading feature of the original design was the Great Hall, two interior views of which, by Mr. Godfrey Sykes, are before you. It was to have been 500 feet long, 250 feet wide, and 210 feet high. Its proposed position was immediately behind the central entrance of the south front, above which it would have towered in solitary grandeur. It was, however, suppressed on account of its cost; but there will be no architectural or constructive difficulties in adding the Great Hall subsequently, and it is to be hoped that before another Exhibition is held, sufficient funds for it may be available.

The first drawings to which I wish to draw your attention, are those illustrating the progress of designs for Exhibition buildings. Most of you are aware that the invitation of the Commissioners for competitive plans for the 1851 Exhibition was responded to by 280 designs.

Many of these gave proof of great skill and ingenuity on the part of their authors, but not one of them was thought to be perfectly adapted for the purpose. A Committee for all matters relating to the building, composed of some of the leading architects and engineers of the day, was nominated, and they prepared a plan which was, in a great measure, a combination and modification of the most meritorious designs furnished by the competitors. You have a drawing of this before you. It was actually determined on by the Committee, and very nearly carried out, but the popular outcry against it was so strong, that the Commission was glad enough to give it up at the last moment, to consider the happy suggestion of Sir Joseph Paxton, which they ultimately adopted, and the beautiful Crystal Palace (now removed, with some alteration, to Sydenham) was the result. This, as it appeared in 1851, you will at once recognise among the various drawings submitted to your inspection. Four years later came the Paris Universal Exhibition, of which you will also see a drawing of the permanent portion now remaining, to the same scale as that of 1851; and, finally, we have several beautiful views, prepared by some of the leading artists of the day, of our building as it will appear next year; I need not enumerate them, the various points from which they are taken being marked against each.

The Site.

You will better understand a description of the site by observing the plan of it, which is before you. The ground on which the main building stands is about 16 acres in extent, and occupies the southern portion of the land purchased at South Kensington by the Commissioners for the Exhibition of 1851. Nearly rectangular in shape, it measures about 1,200 feet from east to west, by 560 feet from north to south. It is immediately south of the Royal Horticultural Society's gardens, the southern arcade of which has been lent to the Exhibition for refreshment rooms. The Cromwell-road forms the southern boundary; on the east it adjoins Exhibition-road; and on the west, Prince Albert's-road.

The whole of this ground will be covered by buildings of a permanent character, and, to secure as much additional space as possible, the two long strips of ground between the east and west arcades and the adjacent roads will be roofed in by means of temporary sheds, to give ample space for the exhibition of machinery and other ponderous objects, which cannot be conveniently shown in the main building. The additional area afforded by these two annexes will be about seven acres, which will make the total extent of the Exhibition 24½ acres.

The general level of the ground is from four to six feet below the adjoining roads, and it has a gentle slope from north-east to south-west. The nature of the soil is well adapted to building purposes; a bed of gravel, from four to twelve feet from the surface, extends throughout the whole area, so that a dry and firm foundation is easily obtained.

The Commissioners for 1851 are the legal proprietors of the site, but to secure the greater portion of it for the intended 1872 Exhibition, they have agreed to reserve about 16 acres of it for that purpose on receiving £10,000 as a sort of ground rent. It is already agreed that to this Society will be granted the lease of the central portion of the Picture Gallery, one acre in extent, along the Cromwell-road, for 99 years, on condition that ground-rent to the amount of £240 per annum be paid to the 1851 Commissioners, it being understood that it will be given up unreservedly for the use of the 1872 Exhibition.

Unlike the 1851 Exhibition, therefore, the removal of which was compulsory, all that foresight could suggest has been done to retain the present buildings, and there can be no moral doubt that if, by any possible means, sufficient funds are available to meet the pecuniary liabilities, they will remain.

General Description.

In the general design of the building, a large ground-plan of which is before you, its suitability for future International Exhibitions has been kept steadily in view, and it has a much more permanent character than the famous Crystal Palace erected for the 1851 Exhibition.

It differs therefore from its predecessor in many essential particulars. It is more commodious, more imposing in its interior, more varied, more suitable for Exhibition purposes, while from without its aspect is of impressive magnitude and grandeur.

Here glass and iron are no longer the main features of the design, but are succeeded by lofty walls of brickwork, which surround the ground on all sides, and form the walls of the fine arts galleries. The east end and west sides, by being continued past the southern arcade of the gardens, have a frontage of 750 feet, and that on the south is 1,150 feet. The north front is the lower arcade of the gardens, which is having a permanent upper story added to it. The interior space thus enclosed is entirely covered in by roofs of various heights, and is divided into nave, transepts, aisles, and open courts; the latter, occupying comparatively a very small portion, are roofed with glass as in 1851, but the other parts have opaque roofs, and are lighted by clerestory windows.

The interior supports are hollow cast-iron columns, as in 1851, of somewhat larger dimensions, being a foot wide, with half an inch of metal in them. They are so arranged as to come at intervals of 25 or 50 feet from centre to centre; in fact, 25 is the unit here as 24 was in 1851, and you will find nearly all the leading dimensions, both vertical and horizontal, to be multiples of that number. The exceptions to this rule are the nave and transepts, which are 85 feet wide; the former runs east and west, and terminates in the centre of those fronts, having its central line 81 feet north of the centre line of the building; the latter extend north and south from the ends of the nave throughout the whole width. At the intersection of the nave and transepts are the great domes. The aisles are continued all round the nave and transepts, and the space enclosed by them forms the open or glass courts.

The columns are supported differently from what they were in 1851. On that occasion they were attached to connecting pieces, which, terminating in a large flat base plate, rested on concrete laid flush with the ground; these connecting pieces of course varied in height to suit the slope of the ground. This has been avoided in the present building by bedding the columns themselves on York slabs laid on brick piers, which are founded on concrete; the slabs being all adjusted to the same level throughout by varying the height of the brickwork, only one length of column is used, and the facility of setting them up is thus greatly increased.

At the north ends of the east and west fronts are the two annexes, temporary, supplementary structures, designed for the exhibition of machinery and other ponderous objects, which could not be conveniently placed in the main building.

The total area roofed in is 988,000 square feet; it is therefore, considerably larger than the 1851 Exhibition, which only occupied 799,000 square feet. It has also, when actual covered space is alone considered, slightly the advantage of the Paris Exhibition, which had a covered area of 953,000 square feet. But if we compare the total space, covered and uncovered, occupied by each, Paris is considerably larger, for the better suitability of its climate for out of door display enabled the authorities of that Exhibition to increase the area of ground given up to exhibiting space by 547,000 square feet, while, with our variable climate, it has not been thought advisable to have more than 35,000 feet of ground unroofed; so that the total areas, covered and uncovered, occupied by the two Exhibitions, are 1,500,000 square feet for Paris, and 1,023,000 square feet for 1862.

The French Exhibition, therefore, considerably exceeded ours in size, but it was not nearly so compact in form, and its temporary annexes made up a very large portion of it, occupying 600,000 of the 953,000 square feet, while our two annexes do not amount to more than one-third of the total area.

I have prepared a diagram, showing the size of these three structures reduced to squares, which will show you at a glance the relative proportions of each.

CONTRACT.

Before going into a more detailed account of the various parts thus generally described, it is desirable to state the means which Her Majesty's Commissioners have adopted for the punctual completion of this stupendous building. The plans were submitted to the competition of ten leading contractors; three tenders were sent in, and that furnished by Messrs. Kelk and Lucas being the lowest, was accepted.

These two most eminent firms, joining their resources together, have become partners for the work, and if one can judge from their antecedents, a better guarantee for punctuality and sound work could hardly have been obtained.

The nature of the contract is peculiar. The whole responsibility for the execution of the works rests with the contractors, and the amount they are to receive is contingent on the receipts of the Exhibition. The Commissioners have the option of purchasing the building out and out, or of merely paying for the use of it. For the rent of the building, a sum of £200,000 is guaranteed absolutely; if the receipts exceed £400,000, the contractors are to be paid £100,000 more for rent, and they are bound, if required, to sell the whole for a further sum of £130,000, thus making its total cost £430,000.

The date agreed upon for the building to be completed and given up to the Commissioners is the 12th of February next, and although even now it is impossible to say, with certainty, whether that date will be rigidly adhered to, yet it is certain that, provided no unforeseen accident occurs, the stipulated time will be very nearly kept. Ample opportunity will thus be afforded for completing the arrangements of the interior by the 1st of May, on which day it will be opened to the public.

SOUTH FRONT.

The general outline of the south front presents an elevation 1,150 feet long, and 55 feet high in the brickwork, with two projecting towers at each end, rising 16 feet above the general outline, and a larger tower in the centre, in which is to be the main entrance to the Picture Galleries. Semicircular headed panels, separated by pilasters, are built at central intervals of 25 feet throughout the whole length, a high plinth extends all round, and between the arches are circular niches, at present vacant, but admitting of future decoration. In the lower portion of each panel is a window, to admit light and air to the ground floor, and for ventilation of the Picture Gallery above.

The exterior is chiefly in plain brickwork, and with no more ornament than that work admits of. The panels are plastered in cement, and experiments are proposed to ornament them in English mosaics. The exterior decoration will eventually depend on the way in which this is carried out, to be decided as funds become available; the present Exhibition will be quite incomplete in this respect, but any amount of architectural ornament that can be paid for may be added hereafter. Yet, in spite of this want of ornament, the author of the design has succeeded, with comparatively very limited means, in producing a very imposing general effect.

Those who have become acquainted with the leading features of the Exhibition building, chiefly through the earlier published drawings, will perhaps be surprised at my describing the south, or principal front, without touching on the great domes, which, according to those drawings, form so important a feature in it. But the fact is that these domes, being 300 feet from this front, can never, in any way, enter into its effect; so far from it indeed, that from no possible position, can they ever be seen at the same time as part of the general front. The error has evidently arisen from the circumstance of the drawings in question having been made up by persons ignorant of the plan of the building, from geometric elevations, in which, of course, the domes appeared as if they belonged to the south front. I am induced to allude to this from the fact that much hostile criticism has been wasted upon the disastrous effect of the domes, as seen from positions, from which they are really invisible. Each dome keeps its place as the centre of its own front, and its effect is utterly independent of its fellow, which is 1,000 feet from it. To this want of comprehension of the subject may be attributed the feeling that has been expressed against the two domes adopted, and in favour of a central one. It will be seen, on a little reflection, that each of the domes is virtually central in its own composition, while a dome in the centre of the whole building would (from the vast extent of the structure and its peculiar situation) have been thrown entirely out of sight on all sides but one, until seen from such a distance as to lose all connection with the building in an architectural point of view. The upper terrace of the horticultural gardens is the only point from which such a dome would have been seen in connection with the building, and this is also the only point from which the two present domes appear simultaneously; but when thus viewed, so completely does the building carry on the symmetrical lines of arcades and terraces, that the duality of the domes is at once accepted as the natural complement of the system which has governed the laying out of the entire quadrangle, namely, that it should be considered with reference to a single building of commanding proportions, situated on the proper site for the chief point of the composition, the most northern and highest part of the ground.

The main entrance to this portion of the building will be through three arches in the central tower, 20 feet wide and 50 feet high, resting on piers 14 feet thick, decorated with terra cotta columns. Above the arches is the cornice and frieze, on top of which, and above the middle porch, is an ornamental clock dial. Passing through the archways, the visitor enters a large vestibule and hall, 150 feet long and 110 feet wide, leading to the Industrial Courts and Galleries. A flight of steps on either side will conduct him to the Picture Galleries, before entering which I shall briefly explain the general principles which have influenced their design.

The chief desideratum of a picture gallery is an equally distributed light throughout, admitted in such a way as will prevent its rays being directly reflected from the surface of the picture to the eye of the visitor. A light, therefore, satisfying this condition, when the observer is standing at a convenient distance, is the only one which can be called perfect.

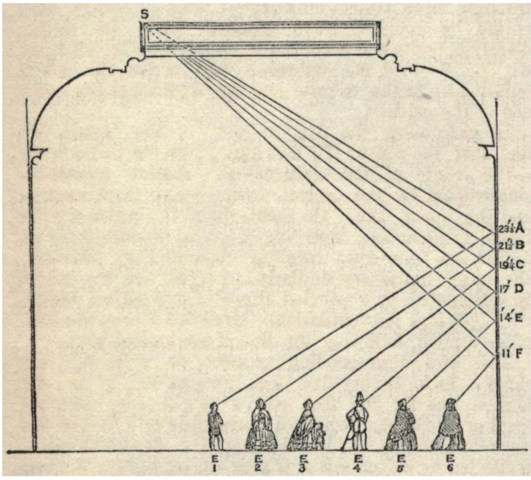
No one can have observed pictures lighted by ordinary windows without experiencing the unpleasant effect produced by the improper reflection of the rays, or glitter from the pictures, as it is called. It is for this reason that one is often puzzled where to find a place from which to see the whole of a large picture to advantage. This defect exists in many of the finest galleries, both in this country and on the Continent, and the result is that some pictures can scarcely be seen at all, while others can only be observed from one or two points, which are always more or less crowded, according to the merits of the subject.

This is obviated by admitting the light at a particular angle from the roof, by means of a skylight extending along its entire length, and which in the present case measures 31 feet in width, that is, 15′ 6″ from the ridge on either side. The entire width of the opening, measured on a horizontal plane, is 29′ 2″. As will be seen by reference to the section, each room is 50 feet wide, and at a height of 32′ 9″, a cove, springing from a cornice on either side, reaches the height of the tie-bar of the principals (42′ 10″ above the floor), 12′ 4″ from the wall, thus leaving a space 25′ 4″ between the coves.

In this space a transparent calico ceiling (hereafter to be replaced by ground glass) is introduced, which, however, is raised 2′ 4″ above the highest point of the cove, or 45′ 7″ from the floor. The space between the highest point of the cove and the eave of the calico is occupied by louvres for ventilation.

These proportions will afford the gallery as much light as possible, and glitter from the surface of the pictures will be avoided. As regards the quantity of light admitted, it may be briefly stated that the opening for admission is exactly half the floor area of the gallery, the former being 25 feet wide, the latter 50. In dealing with the quantity of light, another important point must not be lost sight of, namely, the height of the opening from the floor and its consequent distance from the picture. In this gallery this is reduced to a minimum consistently with the avoidance of glitter, being only 45′ 7″ from the floor.

The following illustration will explain the question of glitter, or reflection of light, from the varnish of pictures:—Supposing a mirror to be hung against the entire surface of the wall. It will be seen, by referring to the diagram, that a ray of light from the skylight, at its extremity furthest from either wall, striking that wall at A, at a height of 23′ 3″ above the floor, will be reflected so as to reach the eye, at E, of a beholder (say 5′ 3″ above the floor) standing 5′ on the other side of the centre of the room, or 30 feet from the mirror, and consequently all the rays striking below that point will fall below his eye, or, in other words, he will not be able to see the image of the skylight in the mirror at any point below 23′ 3″ from the floor, and, as a matter of course, there will be no glitter on the wall, or on pictures hung against it, below that point. Consequently, to see pictures without glitter hung higher up, it will be necessary for the spectator to retire still further from the centre of the gallery.



Transverse Section of Picture Gallery, showing the way of admitting the light to avoid glitter.

It will be seen from the diagram that this point, which is called the glitter point, alters with the position of the beholder. For instance, at E, 5 feet from the wall, the glitter point is at F, 11 feet from the floor, while on coming closer it will descend in proportion. On the other hand, by receding to a distance of 10 feet, the wall may be seen without glitter to a height of 14 feet. Looking again to the same diagram, it will be seen that, apart from all considerations of reflection, a person desiring to see a picture at a height of 14 feet, would naturally retire 10 feet, if not more from it, and the same may be said of the other heights and positions shown on the sectional diagram, so that in any position in which a person can conveniently examine a picture, he may be sure of having its surface free from glitter.

This system of lighting increases the difficulty of successfully treating the exterior of the building, for it prevents any windows being placed in the upper part of the side walls, but after the very successful application of these principles of lighting to picture galleries which have been constructed within the last few years at South Kensington, it was wisely determined to forego all other considerations, and apply the same principles to the rooms destined to receive the choicest works of art of the present age.

On ascending the stairs, the visitor enters a vestibule of similar proportions to the one below, from which he obtains one unbroken vista throughout the whole extent of the main gallery, and it is difficult to conceive a finer effect than that produced by contemplating the noble proportions of the rooms before him.

Entering the first on either side, he will find himself in a spacious hall, 325 feet long, 50 feet wide, and 43 feet high. Passing through this, he will enter one of the wing towers, which forms a room 52 feet by 45 feet, and 66 feet high; he will then enter another room 75 feet long, and of the same width and height as the first, from which he will pass into the end tower, whence he will have an uninterrupted view of the whole main gallery.

The interior decorations of these rooms will be very simple, and may be briefly described as a plain cove extending to each side of the skylight, and resting on a moulded cornice.

Arrangements for thorough ventilation, so essential to the preservation of the pictures and comfort of the visitors, are amply provided for, by admitting fresh air through apertures along the floor level, and allowing the vitiated air to escape through louvres in the skylight.

Descending to the ground floor, the same sized rooms are repeated, but as they are lighted by means of ordinary windows they will probably be devoted to other objects than those coming under the head of fine arts. The part of the picture gallery which is to revert to the Society of Arts is the central hall, and the two large rooms, 325 feet long, on either side of it.

Before concluding this description of the Picture Gallery, its constructive details will be interesting. The foundations throughout are carried down to the gravel, here from 6 to 12 feet below the surface of the ground, in concrete, on which ordinary brick footings are laid. In the front wall the piers carrying the semi-circular arches are 12 feet wide, by 3′ 2″ thick, and the intervening panel having merely its own weight to support, is only 9″ work. The back wall is of rather a different construction. This is a plain wall from top to bottom, with numerous arches through it on the ground-floor; it is built for the most part hollow, with piers so placed that the weight of the floor and roof will come on them. This system of hollow walling gives the greatest strength with the least amount of material, and secures a straight face at either side. The floor of the picture gallery has been constructed of great strength, so as to bear with perfect safety the greatest load which can be brought on it. It is carried on girders 13½ by 12, resting on the side walls and intermediately supported by two cast-iron columns. These girders cross the building at central intervals of 12½ feet, and over them are laid joists 11 in. by 2½ in., two feet apart, to carry the floor-boards. A portion of this floor has been proved to 140 lbs. to the foot, which exceeds the greatest load it can have to bear when densely crowded with visitors. The walls in the picture gallery are lined throughout with wood, which is kept at a short distance from the brickwork, so as to guard against damp. The design of the roof is the same as that already employed by Captain Fowke in one of the South Kensington Galleries, and also in the Irish National Gallery in Dublin, and seems well adapted for its purpose; the principals which support it consist of two strongly trussed double timber rafters, connected together by an iron tie bar four feet above the level of the wall plate. The coved ceiling is thus made four feet higher than it could have been with an ordinary tie-beam roof. As I am not aware that this description of truss is often adopted in a timber and ceiled roof, I am induced to show a drawing of it, as it is of extremely simple construction, and capable of very general application.

The principals are placed at central intervals of 25 feet; they rest on flat stones built into the walls, and strongly trussed purlins, carrying the skylight rafters and upper portion of the cove, are suspended to them. The skylight is glazed with 16 oz. glass, and the rest of the roof covered with slates.

East and West Fronts.

We now come to the east and west fronts, which, though differing from the south, are not less imposing. They are, in all respects, similar to each other in their general effect. Here the stupendous domes, rising to a height of 260 feet, will show to most advantage, and the transept roof, with its lofty clerestory windows, will be in full view. To the observer below, the form of each dome will appear nearly that of a semicircle; this effect is obtained by making its height 11 feet more than its semi-diameter, which will fully allow for the loss by perspective diminution.

From the crown of the dome rises the finial to a height of 55 feet. The dome is in the middle of each façade; its centre is the point formed by the intersection of the centre lines of the nave and transepts, and the front of the building is advanced from it 108 feet. Here, through a noble arched recess, is the main entrance to the industrial courts, the effect of which will, I think, form one of the most pleasing exterior parts of the building. This central porch is 162 feet in extreme width, and contains a deep semi-circular arched recess, of 68 feet span and 80 feet high. It is recessed with a deep covering capable of receiving an almost endless variety of decoration, if such be desired hereafter; while in its present simplicity, it is equally valuable on account of the richness of effect produced by the bold light and shade.

In the tympan of the recess is the great rose window, which will be visible from end to end within, the window in one closing the vista as the spectator looks from a standing point beneath the other. Minor porches on either side, 36 feet wide, forming wings, support a pedimental gable which rises to a level with the ridge of the nave and transept roofs, and is finished with a bold line of balustrade. The entrances beneath are enclosed by an arcaded framing filling up the recess for one-quarter of its height, and having a balcony above. The flat brickwork of the wings is relieved by pilasters, one on each side of the minor porch; these carry a light cornice moulding, surmounted by an attic.

On either side of the central entrance, recessed 15 feet from it, extend 235 feet to the north and south, the exterior walls of the building; these enclose the auxiliary picture galleries. There is a high plinth from end to end, and immediately above are panels formed by a series of coupled semi-circular arched recesses with bold pilasters between. Over all is an appropriate cornice supported by corbels. By the wall being reduced to a height of 36½ feet, the lofty clerestory windows of the transept which rise immediately behind, come into the composition. As in the south front, the lower portions of the panels are occupied by windows to give light and ventilation to the offices and retiring rooms, with which the ground floor on these sides will be occupied. The upper floor is to be used as an auxiliary picture gallery, and is therefore lighted on the same principles as the rooms on the south front.

A visitor will be able to enter the auxiliary galleries, independent of the main gallery, by means of stairs on either side of the east and west entrances; or he will have access to them from the end towers of the latter, already described. They form four distinct rooms, 247 feet long, 25 feet wide, and 17 feet high. The same principles of lighting and ventilating being observed in these galleries as in the larger one, their construction is similar, subject, of course, to the alterations necessitated by their smaller size.

The main and auxiliary picture galleries of the fine arts department will afford 4,600 lineal feet of hanging space, from 17 to 30 feet high; yet all this amount, large as it may seem, is required, and even more would have been desirable, could it, by any possibility, have been obtained. An idea of their extent may be formed by the fact that in walking once up and down the galleries the visitor will have to traverse a mile all but 60 yards, and presuming the moderate allowance of 75 per cent. of the available wall-space to be actually covered by pictures, their aggregate areas will equal 7,600 square yards, or about 1½ acres!

North Front.

To complete our survey of the exterior, we must examine the north front, for which purpose it is necessary to enter the Royal Horticultural Society's Gardens. The large space here afforded admits of a connoisseur critisising it from several points of view. For our purpose, however, it will suffice to imagine our station to be on the central walk, one or two hundred yards from the South Arcade.

From no other point will a better appreciation of the building be obtained. The South Arcade forms the basement of the north front, to which an upper story is now being added. The façade is divided into two floors, except the central portion, which has a mezzanine interposed. The ground floor, consisting of the Southern Arcade of the Gardens, with its pleasing arrangement of twisted terra-cotta columns, is, doubtless, familiar to most of you. The whole front is divided into five faces, in different lines of advance. By subdividing the centre mass into three sections, a very great variety and relief of design is obtained. The middle of the front is occupied by the entrance from the gardens, through three 10-feet ornamented brick archways, supported by coupled stone columns; these are immediately opposite the Southern Entrance, from which point will be obtained one unbroken vista across the whole building up to the cascade and conservatory at the north end of the gardens.

In examining the five divisions of the façade, we find that the centre (70 feet high) presents three levels —the arcade of the gardens—the shallow mezzanine (interrupted by the central arches before mentioned)— and the upper floor. On each side of the centre are the lights of the arcade, consisting of tripled ornamental brick arches, on terra-cotta columns, separated by pilasters; the upper lights are similarly arranged, and the whole is surrounded by a paneled frieze of appropriate design, with openings for ventilation. Over this is seen the roof, of good pitch, following the line of the ground plan.

The two corresponding recesses on each side are thrown back twenty-five feet, and extend in an unbroken line for 200 feet, with a height of 60 feet; the level of the upper floor here corresponds with that of the centre mezzanine, and the lighting, both above and below, is effected by eleven sets of tripled arches, similar to those in the centre division.

At each end are the returns into the garden, and in the fifty feet which completes the length, is an entrance archway, ten feet wide, on the far side of which the tripled arched light is repeated.

The treatment of the whole façade is most effective; much diversity is obtained by the arrangement of the masses; general uniformity is successfully sought, and every part harmonises admirably with the adjoining arcades. At a short distance behind rises the lofty ridge of the nave, terminated at either end by the imposing outline of the great domes.

The upper and lower floors on this front occupy an area of 26,800 square feet; the whole of this space is to be given up to the refreshment rooms and offices connected with them.

A better choice of situation could not have been made. The exhausted sight-seer, surfeited and bewildered by the endless variety of objects furnished by the Exhibition, will here retire to recruit his mental and bodily vigour for fresh exertions. Here will be retailed refreshments of all kinds—every variety of eatables, from the delicate sponge-cake and strawberry ice to the honest substantial roast beef. The teetotaler will find himself bountifully supplied with waters—aerated, medicated, and pure, too numerous to mention; or, should he be so disposed, he may even indulge in ginger-beer and lemonade, while the more generous liver will obtain anything he chooses to call for—from bitter ale to iced champagne.

Let us glance at the mental refreshment afforded; on ordinary days it will be the quiet contemplation of the fairy-like scene before him; here will the mind feast, while the eye wanders from the sloping green banks, and verdant alleys of the pleasure gardens, studded with flowers basking in the sun, to where the great cascade—appropriate monument to the parent of all around—pours itself into its wide and glittering basin below. On the occasion of *fêtes*, the beauty of the scene will be still further increased by throngs of gaily dressed visitors to the gardens, and the enjoyment of it enhanced by the music provided for their entertainment.

Nor will the pleasure ever be clouded by thoughts of the possibility of these rooms being removed, for no matter what are the financial results of the Exhibition, they, at least, will remain after its close, and form part of the Horticultural Gardens.

Nave and Transepts.

Let us now begin our survey of the interior.

In this it is not my intention to go minutely into the construction of the whole, and I shall only dwell on those parts which present any novelties; the limited time at our disposal necessitates this, and even were it otherwise, it would be unprofitable, for there are certain portions without any claim to novelty, a description of which would be uninteresting, as they differ in no essential point from many ordinary iron structures.

To commence with the nave and transepts, which are similar in all respects.

Entering by the east or west front, the visitor rises two steps, which brings him to the level of the dais under each dome. From this point, six feet above the rest of the floor, he will in one view command the interior of the whole building. A very serious obstacle in the ground has been cleverly overcome by this arrangement. The roads surrounding the site are about five feet above the level of the ground on which the building stands. Had this contour been rigidly followed, the visitor would have had on entering at once to descend five feet.

This immediate descent would have been most inconvenient, and would have totally marred the otherwise imposing interior aspect of the building. Had the whole area been raised to suit the road level, it will be obvious that the cost would have been considerably increased. From the dais three flights of steps, 80 feet wide, conduct the visitor into the nave and transept on either side. The nave is 800 feet long, 85 feet wide, and 100 feet high to the ridge of the roof.

The supports on either side consist of square and round cast-iron columns, coupled together; the former carry the gallery floor, and the latter, advancing into the nave, receives the principals of the roof. These columns are 50 feet high, in two lengths of 25 feet each, and from their capitals spring the roof frames, which consist of three thicknesses of plank, from 18″ to 2′ 6″ deep, firmly nailed and bolted together, and so arranged that their ends break joint. The centre plank is 4 inches thick, and each of the outer ones is 3 inches; the lower edges are tangents to an imaginary semi-circle, round which they form half of a nearly regular polygon. From the springing rise the posts of the clerestory windows, 25 feet high. The principal rafters of the roof frames rise from the top of these posts, and are carried up after passing a tangent to the extrados of the arch to meet at the ridge in a point 25 feet above the top of the clerestory. The angles over the haunches and crown of the arch are firmly braced together, so as to reduce the thrust as much as possible.

The rib is repeated 30 times in the length of the nave, and from its graceful curve and elegant lightness it produces an extremely fine effect. Between every roof principal is a clerestory light 25 feet high, consisting of three arches springing from intermediate mullions. The roof is covered with felt, on 1½ inch plank, which is laid diagonally so as to brace the whole together. The nave is therefore entirely dependent for its light on the clerestory windows; this is found to be amply sufficient, and a substantial water-tight covering is thus ensured, having the advantage of obviating all chance of that unpleasant glare which the experience of 1851 proved to be unavoidable with a glass covering, while at the same time it will be cooler in summer and warmer in winter. The rain-water from the roof is conducted, by means of gutters, down the columns supporting the ribs to drains laid under the ground floor, which carry it off to the drains under the adjoining roads.

From each end of the nave, at right angles to it, and extending north and south for a length of 650 feet, run the transepts. They are the same width and height as the nave, and the ribs of its roof are of precisely the same construction. This construction will be more fully understood by referring to the drawing, which shows the arrangement of planks and bracing.

The nave ribs have been made at Mr. Kelk's yard in Pimlico, and carted to the ground in four pieces. When on the spot ready for hoisting, they were formed into two pieces so arranged that the point of junction should always be at the ridge. To fix the principals in the nave roof, a moveable scaffold of very clever design was used. A drawing of it, showing its construction, is before you. It contains 4,740 cubic feet of timber, and weighs 87 tons; but, notwithstanding this, it is moved by four men working crowbars under the wheels. One half of a rib was first hoisted to its place; when in position, the other half was raised, and as soon as both were fixed true, they were joined together by completing the arch and bracing over its crown. As soon as one rib was up, the travelling scaffold was moved to the adjoining bay, and the next rib completed. The purlins and boarding were then fixed, after which the scaffold was again moved forward, and another bay covered in the same manner.

The hoisting is all done by a most ingenious winch, or hoist, worked by steam, the invention of Mr. Ashton. This machine has two grooved cast-iron barrels, which are made to revolve by means of a system of toothed wheels, connected with a portable steam engine. A rope is passed round the grooves. On the fall being manned, and the barrels set in motion, the coils of the rope are gathered up, and a great hoisting power obtained. By means of snatch blocks and pulleys, ropes are led from this beautifully simple machine to all parts of the building, and the heaviest materials, such as girders, columns, scaffold beams, &c., are hoisted to their position with the greatest ease and rapidity. As an instance, I need only mention that the heavy floor girders, weighing about 1¼ tons, were raised in two minutes, columns in about the same time, and the ponderous ribs of the nave, weighing 6½ tons, required only from ten to twenty minutes to raise them their full height.

The only portion of the Crystal Palace of 1851 which can be compared with the nave is the great central transept, whose height was 104 feet, or 4 feet more than that of the nave, but it was narrower by 13 feet, being only 72 feet wide, while the total length of the nave of the present building will be very nearly three times as great.

The ribs of the transept were fixed over a standing scaffold all through, which alone consumed 30,336 cubic feet of timber. The reason for this was that as the domes divide the transepts into four separate lengths, four travellers would have been necessary, and though these would not have taken nearly so much material as the standing scaffolds, yet the contractors thought that the difference would not have compensated for the additional labour required in building the former.

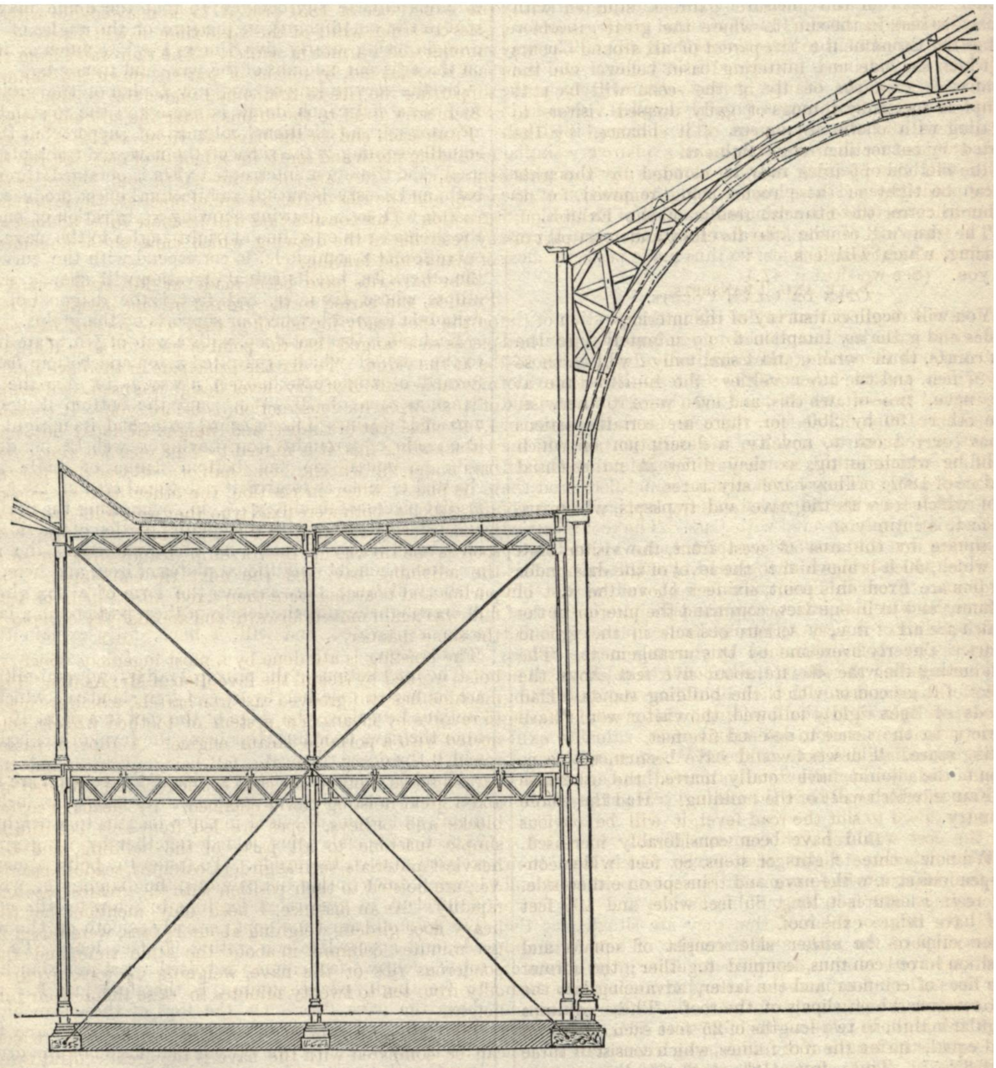
AISLES, GALLERIES, AND STAIRS.

By referring to the general plan, you will see that in it are shown three large buildings parallel to each other, the refreshment rooms, the nave, and the picture gallery. These are connected at their ends by transepts, and thus two vast oblong spaces are enclosed, one to the north, and the other to the south of the nave.

On both sides of the nave and the inner sides of the transepts, are aisles 50 feet wide. Another aisle, 25 feet feet wide, is carried along the outer sides of the transepts and along the back wall of the south front.

After deducting the space occupied by all these aisles from the oblongs above referred to, we have remaining two smaller ones, that north of the nave 750 feet by 87, and that at the south of it 750 by 200 feet. Each of these is subdivided into three courts by two 50 feet aisles. The centre courts are 150 feet long, and those at the ends 250 feet. The dividing aisles on the north lead to the refreshment rooms, on the south to the entrance vestibule.

Twenty-five feet above the ground floor are the galleries, following the same line as the aisles; they give an additional exhibiting space of 203,000 square feet. Particular care has been taken to make these galleries amply strong for the heavy moving loads they will have to bear. The floors are supported on cast iron girders fixed to the columns; over them are laid two strong suspended trusses which carry the joists and boarding.



Section of One-half of a Nave Rib, showing the cross-bracing in the Gallery.

Supposing a floor to be loaded with 140 lbs. to the square foot, which, being more than the weight of a dense crowd of people, is heavier than any weight it can have to bear, the greatest load that can thus be placed on a girder is 34 tons. The breaking weight of the girders used is 88 tons, and every one of them is proved in a hydraulic press, specially constructed for the purpose, to a load of 38 tons, to avoid all risks of bad castings being used. Over each gallery is a flat roof covered with felt, supported like the floor, but of much lighter construction. Sixteen flights of steps, 10 feet wide, give ample means of ascending from the ground to the upper floor.

The galleries play a very important part in the construction of the building; they are made to form an abutment to the nave and transept roof, and the particular form of bracing by which this is effected is the ingenious suggestion of Mr. Ordish. The roof thrusting outwards tends to throw the columns out of the perpendicular; strong iron braces are, therefore, anchored to the foundation of the inner column, and carried up to the top of the opposite outer column, which are thus made to counteract the thrust of the roof. Another bracing, anchored to the footing of the outer column, is carried up to the top of the inner column, to secure it from being acted on by the force of the wind. This vertical cross bracing is repeated at every 100 feet, or every fourth bay, and by introducing horizontal diagonal bracing under the roof flats, they are turned, as it were, into a deep horizontal girder, supported at two ends by the columns vertically braced as just described. This horizontal girder, therefore, takes the thrust of the three intervening ribs. The way in which the bracing is introduced is very clever, and is an admirable example of the perfect control which the simplest-mechanical means, properly applied, gives us in dealing with enormous masses. The bracing is all adjusted by connecting screw links, on a plan very similar to the method of joining railway carriages; by this means it can be tightened at pleasure, and the position of the columns corrected to the minutest fraction of an inch.

The drawing of the rib also shows the vertical cross bracing, which will, I hope, be thus made perfectly clear to you. (See woodcut p. 47.)

Open or Glass Courts.

You will recollect that in describing the position of the aisles and galleries, I explained to you how they enclosed six courts, three north of the nave, two of which are 250 by 87 feet, and the other 150 by 87 feet—three south of the nave, two of which are 250 by 200 feet, and the other 150 by 200 feet. These form the open or glass covered courts, and are the only portions of the building which in this particular resemble the Crystal Palace of 1851. They have only a ground-floor, and the roof, which is on the ridge and valley plan, but in spans of 50 feet, is entirely covered with glass. The roof is carried on square iron columns 50 feet apart each way, at the top of which, 50 feet above the ground, wrought-iron trellis-girders are fixed on lines running east and west. The columns and trellis-girders carry the principles of the roof, which are all of iron, on the trussed rafter plan, eight feet apart. The roofs are drained by channels in the vallies conducting the water down the hollow iron columns. The effect of these courts with their light glass roofs admitting floods of light into the building will give a pleasing variety to the interior, and afford most valuable exhibiting space. The whole of the S.W. court, with a portion of the adjoining aisles and galleries, has been allotted to France, which will have the greatest space of any foreign country.

Domes and Groined Ribs.

We now come to the great domes, which, from their stupendous size, will form one of the most prominent and interesting features in the building.

I have before explained that they are situated at the intersection of the nave and transepts. Their form and position have been thus determined. The intersections of the lines of columns in the nave and transept aisles form two octagons, which, though not mathematically regular, are regular in this one respect—their opposite sides are parallel and equal, the length of the sides being alternately 85 feet and 35′ 5″. The points at the angles of these octagons are the chief supports of the domes. For this purpose there is a column at each angle, 2 feet in diameter, and for architectural effect, as well as for carrying the groined ribs, the object of which I shall presently explain, the lower portion of these 2-feet columns is clustered with two round and one square column of smaller dimensions.

But though the chief points of support are at the eight angles of the octagon, the dome is a dodecagon, the other four points being thus obtained. The last bay of the nave and transept, instead of having a roof resting on wooden principals going straight across, has two iron diagonal ribs crossing it, forming as it were a groined arch, whose apex is a point in the centre of the bay and in a line with the roof ridge. By joining the apices of these groins and the points in the octagon already determined, we get a nearly regular dodecagon, having its opposite sides parallel and equal, and with eight sides in pairs each equal to 43′ 9″, and the four remaining sides coming between these pairs, each equal to 35′ 5″ This dodecagon forms the base of the dome, which will thus have eight sides over the nave and transepts, and four sides over the corners of the aisles, equal respectively to the dimensions just given, and a diameter of 160 feet.

Each groined rib transmits the weight on it to two columns outside the octagon, so that the dome may be said to rest on 16 points, its pressure on the angles of the octagon being nearly five times ($4\frac{9}{25}$) as much as it is on the adjacent columns of the nave and transepts.

By the very ingenious and novel plan of the groined roof ribs a dodecagon dome is made to seem to stand on an octagon; no additional columns of support but those actually coming in the sides of the nave and transepts are used, and thus an uninterrupted vista is obtained through both, and a very beautiful architectural effect produced.

You will see a drawing showing a projection of one of the groined ribs on a line at right angles to the nave, its curve forms a semicircle, to correspond with the curve of the other ribs, but its actual elevation will show a semi-ellipse, whose diameter, $88\frac{1}{2}$ feet, is the diagonal of the rectangle formed by the four supports of the groins.

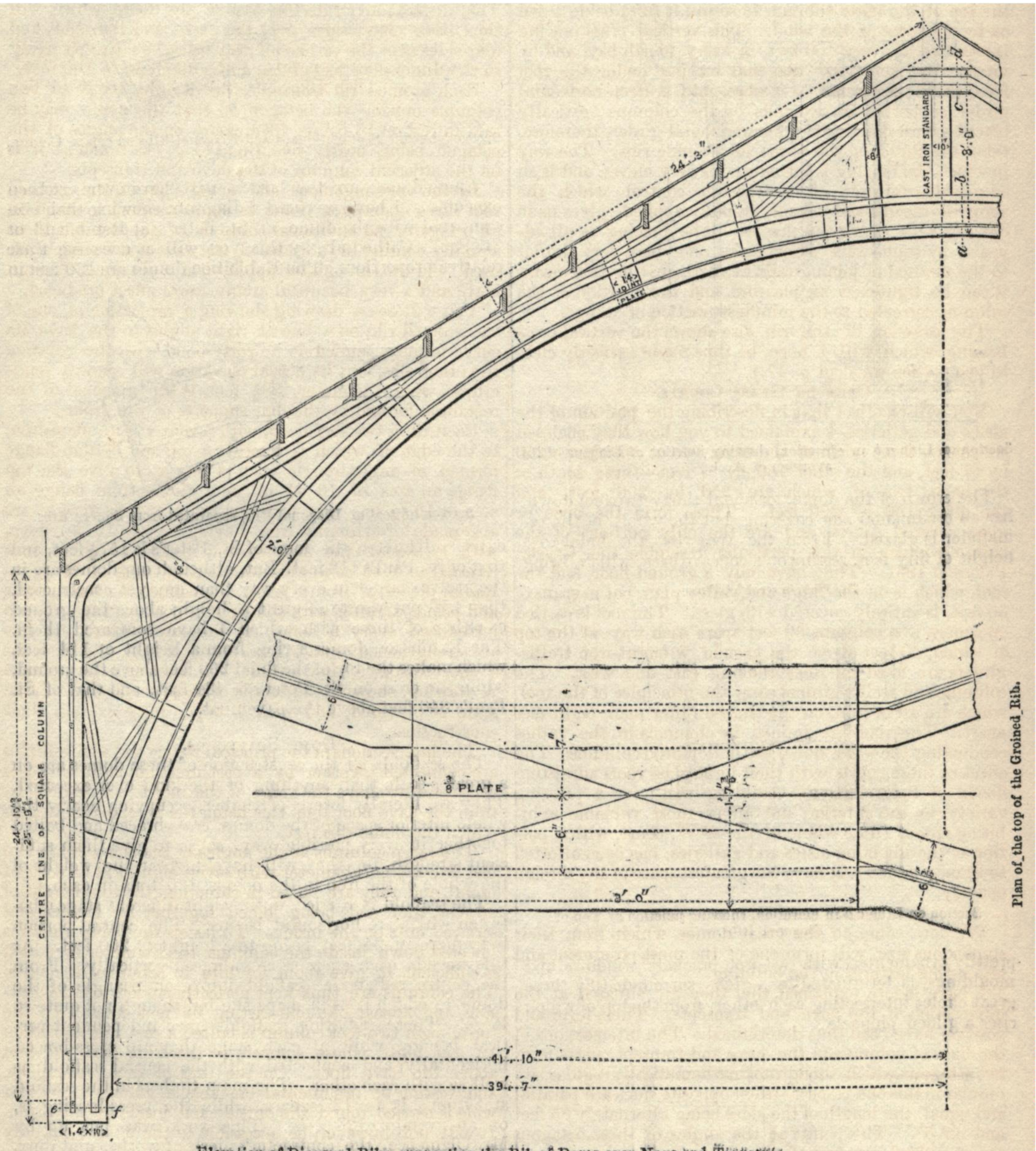
Each rib is two feet deep, with a web of $\frac{3}{8}$ in. plate-iron, to the edge of which is rivetted a top and bottom flange formed of angle-iron in such a way as to give the top flange an area of $10\frac{11}{16}$ in., and the bottom flange an area of $19\frac{11}{16}$ in. The principal rafter and its upright are also made of wrought iron, having a web 12 in. deep, with an equal top and bottom flange of angle iron rivetted to it so as to give it a sectional area of $20\frac{5}{16}$ in. Radial pieces of iron $8 \times \frac{5}{16}$ in., connecting the upright and principal rafter with the circular portion of the rib, are introduced every 5 feet. At the intersections the ribs are strengthened by additional plates of iron, and here, for a short distance, they assume the form of a box girder. A drawing, showing the details of these portions on a large scale is provided, and will, I hope, fully explain their construction.

The intersections of the principal rafters and semi-ellipses are connected together by a cast-iron standard, which is continued up above the ridge of the roof to a point 107 ft. from the nave floor line, this being the level of the bed on which the dome ribs rest.

The large columns at the angles of the octagon are two feet in external diameter with seven-eighths of an inch of metal, and they are raised in three lengths to a height of 95 feet, their ends being joined together by flanges and screwed nuts on the inside. To fasten the bolts, a man is lowered down inside the columns, the diameter of which is sufficient to give room for him to screw up the nuts. The columns are thus kept perfectly smooth on the outside, and appear like one casting 95 feet long. To the top of each two-feet column is bolted a cast iron stanchion 12 feet high, whose summit is therefore just 107 feet above the nave floor. On the tops of these stanchions, and resting on ornamental brackets, a gallery three feet wide is carried round the outside and inside of the drum. It will not, however, be accessible to the public, but only to men employed in opening the louvres which are here placed for ventilation. To the upper side of the gallery, and through it to the stanchions, the double wrought-iron tie-plate acting as the dome's hoop, is securely bolted. It consists of an inner plate of iron $\times\ 6'' \times \frac{3}{8}''\ 6 \times \frac{3}{8}$, which is connected with an outer plate $10'' \times \frac{3}{8}''\ 10 \times \frac{3}{8}$, so that both these plates take the thrust of the dome. The dome ribs are bedded on the top of them, with their feet bolted through to the heads of the stanchions.

Each dome rib is an iron girder made of boiler plate and angle iron. The top and bottom flanges are nearly equal in section, the former being 19$\frac{5}{8}$″, the latter 20$\frac{3}{4}$″ 20$\frac{3}{4}$. There is no continuous web between the two flanges, but they are joined at 8 feet intervals by two pieces of boiler plate, having a 3″ wood spacing piece between. The first seven feet of each rib is vertical, and the girder is here 3$\frac{1}{2}$ feet deep. At the summit of the vertical portion, which is 114 feet above the nave floor level, is the springing line. The top flange follows the curve traced by a radius of 91′ 9$\frac{7}{8}$″, the centre being a point 12′ 3$\frac{3}{16}$″ beyond the centre of the dome; the bottom flange is on a curve whose radius is 90′ 1$\frac{1}{4}$″, and centre 14′ 0$\frac{1}{2}$″, beyond the dome's centre.

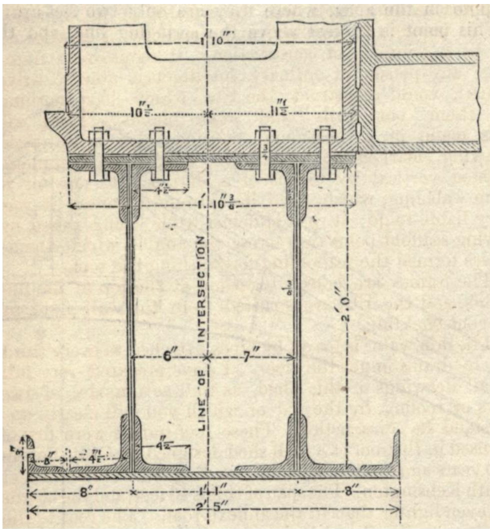
The two flanges thus come nearer each other as they approach the apex, where they are only two feet apart. This point is 91 feet above the springing line, and the 12 ribs meet there, abutting against a strong cast-iron pipe, one foot in diameter, to which they are bolted.



Plan of the top of the Groined Rib.

Elevation of Diagonal Ribs, supporting the Rib of Dome over Nave and Transepts.

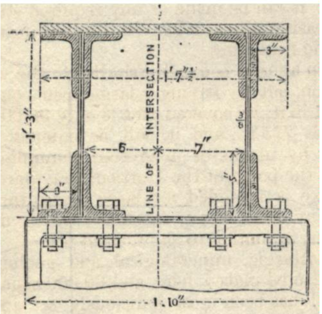
Eight wrought-iron purlins between the springing and the apex are bolted to the ribs, and the divisions thus formed are strongly cross-braced, so as to make the whole as rigid as possible. These purlins are formed of two pieces of T-iron, joined together at six-feet intervals by a half-inch plate. They vary in section, decreasing as they approach the summit, and those in the larger triangles are slightly heavier, on account of their longer bearing. The first purlin of a large triangle is 1′ 8$\frac{11}{16}$″ deep, and its T-iron flanges are 3$\frac{1}{2}$′ × 3$\frac{1}{2}$″ × $\frac{1}{2}$″. The upper purlin has a continuous web plate 10$\frac{15}{16}$″ deep, with top and bottom flanges made of four pieces of L iron, 2″ × 2″ × $\frac{1}{4}$″. These dimensions are altered in a small triangle, the depth of the lower purlin being 1′ 8$\frac{15}{16}$″, and the **T**-iron 3″ × 3″ × ½″; the upper purlin is here 11″ deep, but the **L** iron is the same as before. Wrought iron sash bars to carry the glass are rivetted to the purlins every 18 inches, every fifth bar being made sufficiently heavy to assist in the cross bracing, and prevent the purlins twisting.



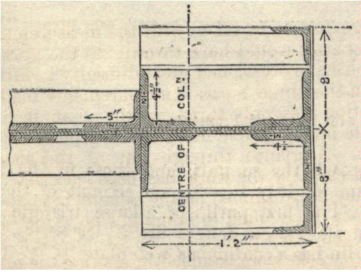
Section on Line *a b* in elevation, showing junction of Diagonal Ribs at crown of Arch.

The crown of the dome, for about thirty-two feet down, has an ornamental zinc covering, but the whole of the remainder is glazed. From the apex rises the finial to a height of fifty feet, resting on a concave base, which, being prettily ornamented with cast-iron brackets, windows, and mouldings, is terminated by a globe surrounded by three great circles intersecting each other, from the top of which rises a gilded pinnacle.

Top Plate to receive Column.

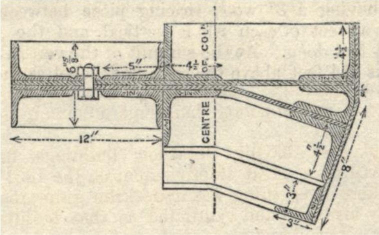


Section on Line *c d* in elevation, showing junction of Top of Diagonal Ribs.



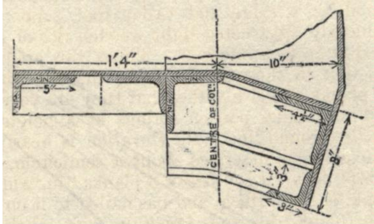
Section on Line *e f* in elevation, showing Section of Seat of Diagonal Rib on corner column of Dome.

Clerestory windows, on a level with those of the nave, are continued round the drum of the dome; panels above these reach to the gallery level, which has an ornamental railing all round.



Section showing Seat of Square and Diagonal Ribs on cap of Column of Nave.

These domes are the largest that have ever yet been executed. I have prepared a diagram, showing their size compared with the domes of St. Peter's at Rome, and of St. Paul's Cathedral; by this you will at once see their relative proportions. The Exhibition domes are 160 feet in exterior diameter, the dome of St. Peter's is 157½ feet, and that of St. Paul's 112 feet. But, although our domes are in themselves larger in every way than any yet constructed, they will not rise to so great a height above the ground as either of those with which I have compared them. The Exhibition domes spring from a height of 114 feet, which makes the top of the finial 260 feet above the ground, while the cross on St. Peter's is 434 feet, and that of St. Paul's 340 feet above the pavement.



Section of Seat of Diagonal Rib, separated from Square Ribs.

Dome Scaffolds.

The scaffolds for the construction of these domes are on a greater scale than anything of the kind ever executed. They are literally forests of timber, occupying nearly the whole interior space of the domes, cross-braced and bolted together in every possible way, so as to give them sufficient strength, for they will have to bear the weight of the whole of the iron in the domes, 120 tons in each.

The scaffold is carried up in eight different stages, between which are horizontal beams. The central portion is a square of 24 feet, rising to a height of 200 feet. As this ascends each stage is cross-braced vertically. From the centre radiates a scaffold into each triangle of the dome, to which it is in shape similar, though not quite so large. These radiating scaffolds have independent vertical bracing, while at each stage they are cross-braced horizontally, and connected with the central scaffold as well as with each other. The main timbers in the scaffold are from 14″ to 12″ square, while the cross-bracing is, on an average, 12″ × 6″. This work was put up by Mr. Clemence, the contractor's clerk of works, and must be considered a *chef-d'œuvre* in scaffolding; it is of immense strength, and so skilfully constructed, that very little of the timber in it has been spoiled by cutting, so that when taken down, every particle of wood used, amounting to 40,672 cubic feet in each scaffold, will be as available for any other work as if it had just come from the builder's yard.

Among the drawings you will see a plan of the scaffold, which will show you all the details of construction.

They were completed in eight weeks, and every beam in them was hoisted by the steam-winch before described, without the aid of which they would have required at least double the time, and have been far more costly to execute.

The Annexes.

Having now gone through the various portions of the permanent buildings, I shall proceed to a description of the annexes or temporary buildings adjoining the Exhibition.

The plan of having detached buildings for machinery will be a great improvement on the 1851 Exhibition, where everything was under the same roof; for, admirably arranged and ventilated as that building was, yet the smell of oil and grease inseparable from machinery, occasionally intruded itself on those who were examining objects which might have been expected to afford an exemption from that unpleasantness.

The western annexe is 975 feet long; for a length of 720 feet, it is 200 feet wide, the remaining 255 feet being 150 feet wide. The east side is enclosed by the back wall of the west arcade of the gardens, and the west side, which adjoins the road, has a plain lath and plaster front. It is covered by a ridge and valley roof, supported on most ingeniously constructed light wooden ribs of 50 feet span, placed at 15 feet intervals. These ribs are similar in construction to those of the nave, that is, they are formed of planks nailed together, but they are very much lighter. The circular portion springs at a height of 10 feet above the ground line. Its elevation is nearly half of a regular polygon, described about a semicircle, whose diameter is 50 feet; it consists of 3 planks 9 in. wide, the centre plank is 1¼ in. thick, and has nailed to it on either side a ¾ in. plank, the ends breaking joint all through. The principal rafters, which are composed of two ¾ in. planks, rise from a point 28 feet above the ground, and meet above the curved ribs, so as to make the ridge 5 feet above the crown of the arch. The upright, which has its foot morticed into a sleeper resting on piles, is formed of an inch and a quarter centre plank, with a ¾ in. plank on each side, having a strengthening piece 4 in. × 3 in. spiked to it on either side to prevent its bending. The principal rafter and upright are connected with the curved rib by radial pieces of 1¼ in. plank, which are brought rather below the intrados of the curve, and finished off, for the sake of ornament, by a spear head. The roof frames are therefore merely planks nailed together, and so disposed that the weight comes on their edge. One half of the roof is covered with boards and felt, and the other half has a glazed skylight, with louvres for ventilation throughout the whole length. The span of each rib is 50 feet, so that in the 200 feet width there are four spans, and in the 150 feet, three.

The west annexe will be devoted to the exhibition of machinery in motion, for which purpose steam pipes, water pipes and shafting will be led through it. There will be a boarded floor all through, but the heavy machinery, will, of course, be bedded on the ground, independent of the floor, which will only be used for passages. The entrance to it will be through the north end of the west transept, from whence the successive ribs of the roof afford a beautiful perspective view from end to end, and produce a singularly light and elegant effect.

The superficial extent of the west annexe is 184,000 square feet, or about 4¼ acres; it will of itself be a perfect exhibition of its kind, and contain the most ingenious mechanical contrivances of this inventive age. Here we shall see some of the most ponderous marine engines in comparative miniature, but yet sufficiently powerful to drive shafting to work full-sized machines employed in various branches of manufacture. The many uses to which water power can be applied will be shown, and we shall have specimens of the most interesting machines from every part of Europe and America performing the office for which they were designed.

To a mechanical mind this will doubtless be the most interesting section of the Exhibition, for here will be grouped alongside each other the most cunningly devised machines in the world. What endless occupation and suggestive thought will a careful comparison of them all give rise to!

The building itself will be worthy of its contents, for in ingenuity, economy, and simplicity, it is allowed to be a triumph of construction. It requires no framing; any person of ordinary intelligence, able to drive a nail, could construct the ribs, which have nothing in them but nails and sawn planks. Each rib was made in a horizontal position, over a full-sized drawing, marked on a platform, and, when complete, hoisted vertical by means of a derrick; to prevent it from wabbling, which, from its extreme thinness, it was very liable to do; it was stiffened while being raised by having scaffold-poles tied across the angles, which themselves formed the scaffolding for finishing the roof.

The frames are braced together at the top of the uprights, and the ribs are strutted from the wall-plate, to prevent buckling.

The rain water is let off by pipes, attached to every third rib, to drains under the floor. I have prepared very full detail drawings of this shed, as well as a model of two bays of roofing, by the aid of which you will clearly understand its construction. These roof frames were first of all used in the roof of a drill shed designed by Capt. Fowke two years ago for the 1st Middlesex Engineer Volunteers, at South Kensington. The span of this is 40 feet, and the boards are even lighter than in the annexe-roof. The roof to the entrance to the Royal Horticultural Society's Board-room was the next made, and its ribs are exactly of the same dimensions as in the machinery shed, except that, in the latter they are stilted up six feet higher, and are 15 feet apart, instead of 10 feet.

I believe it has since been copied for several volunteer and other sheds, and it is doubtless capable of very general application, whether used in temporary or permanent buildings, for it can be made of any required strength by merely increasing the planks; its leading feature is no bolting and no framing.

The eastern annexe is exactly similar to the western in its construction, but by having a large open court 350 ft. by 100 ft. left in it, its covered area is only 96,000 ft. Its total length is 775 ft., and it will be entered from the east transept by means of a covered communication or tunnel under the porch of the Horticultural Gardens.

This annexe is intended for large agricultural implements, and any other heavy machines which do not require to be put in motion to show them off.

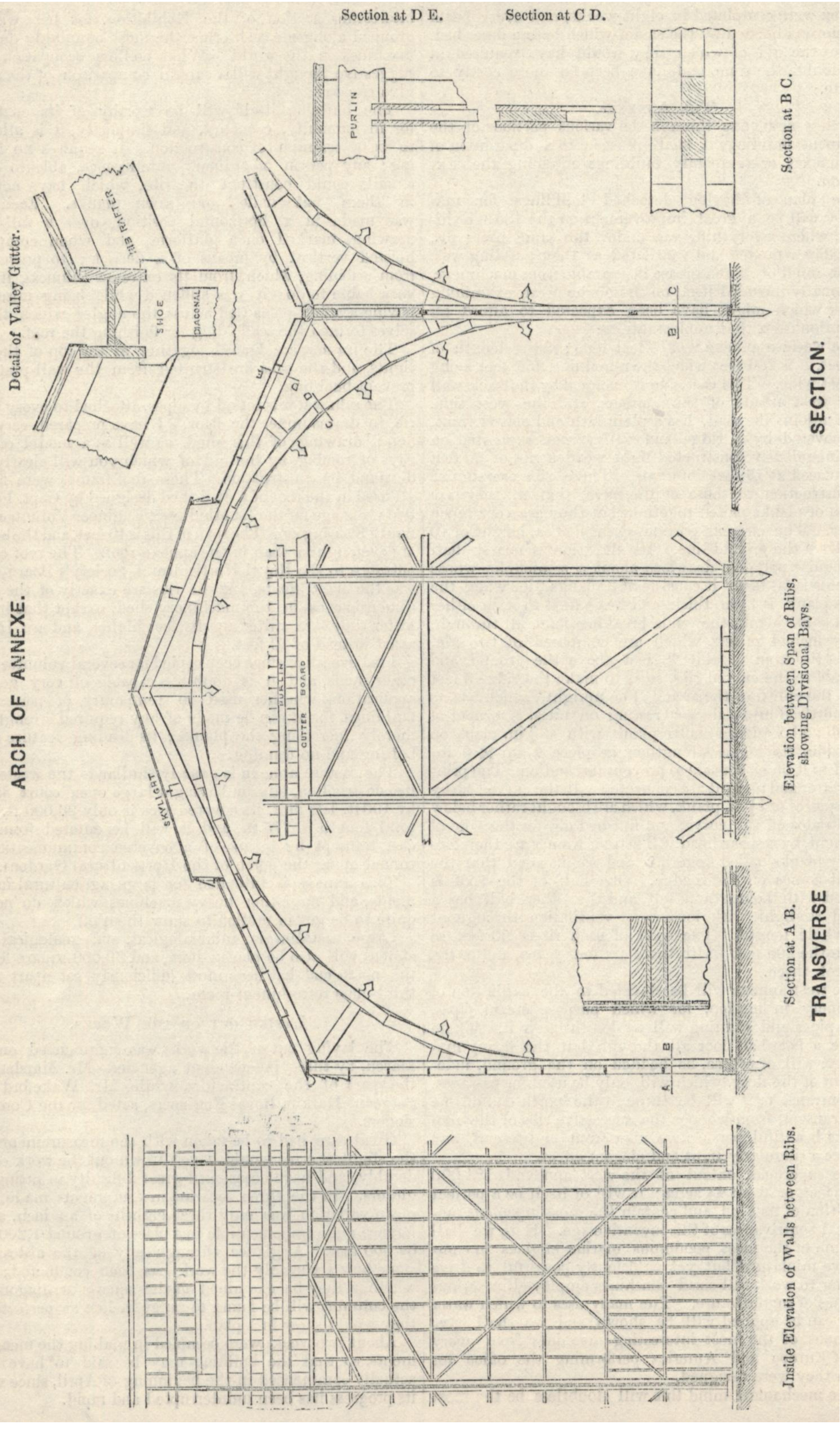
Large metallurgic, mineralogical, and geological specimens will also be placed here, and 30,000 square feet at the north end has been most judiciously set apart for a third-class refreshment-room.

Laying out of the Works.

The laying out of the works was commenced on 9th March, by three independent agencies—Mr. Marshall on the part of the contractors, while Mr. Wakeford and Sergeant Harkin, Royal Engineers, acted for the Commissioners.

Great care had to be taken with the measurements, for the slightest error would have thrown out the work considerably, and have occasioned great difficulty in fitting the girders. In the three separate measurements made, the mean variation was only three-eighths of an inch, a difference quite imperceptible in a piece of ground 1,200 feet by 600 feet. A glance through any of the aisles will show how accurately the work has been conducted; and whether they be examined on the square or diagonally, the columns will be found to range in line as perfectly as they would show in a plan.

About two weeks were occupied in making the measurements, so that the building may be said to have been actually commenced in the beginning of April, since when its progress has been uninterrupted and rapid.


Section at D E.
Section at C D.
Section at B C.
Detail of Valley Gutter.
RIB RAFTER
SHOE
DIAGONAL
PURLIN
ARCH OF ANNEXE
SKYLIGHT
GUTTER BOARD
PURLIN
C
D
E
B
C
A
B
Elevation between Span of Ribs, showing Divisional Bays.
Section at A B.
TRANSVERSE SECTION.
Inside Elevation of Walls between Ribs.

You will see arranged round the room a very beautiful series of photographs, taken by Corporal Spackman, Royal Engineers, illustrating the state of the works at the end of each week from the commencement.

Quantities.

It may perhaps interest you, and at the same time give you a good idea of the size of the building, to state the quantities of the chief materials used in its construction.

There are 7,000,000 bricks used; these have all been suppiled by Messrs. Smeed, of Sittingbourne. Nearly all the cast-iron work has been supplied from the Stavely iron-works, in Derbyshire; there are upwards of 4,000 tons of this metal in the building; and to show you what care has been taken with the castings, I need only say that only four girders have proved defective, by breaking in the hydraulic press.

There are upwards of 820 25-feet columns, equal in length to 4 miles, and if the 1,266 girders used were placed end to end they would reach a distance of 6 miles. The wrought iron is chiefly supplied by the Thames Iron Company, the builders of the "Warrior." This firm has undertaken the supply of all the iron for the domes, the groined ribs, the 50 feet roofs, and the iron trellis girders which support them; the total quantity of wrought iron in connection with these parts amounts to 1,200 tons.

The timber work is executed partly at the works of Messrs. Lucas, at Lowestoft, and partly at Mr. Kelk's works at Pimlico; the former prepare all the window sashes, &c., &c., by machinery; and the latter constructs the heavy ribs of the nave and transepts. Upwards of 1,300,000 super feet of floor will have to be laid.

To cover the roofs 486,386 square feet of felt are used, equal to 11 acres; and to complete the whole of the glazing requires 553,000 super feet of glass, which weighs 247 tons, and would cover 12¾ acres.

The whole of the working drawings have been prepared by Mr. Meeson, who has had charge of the details of construction from the time that the building has been put into the hands of the contractors, and who performed a similar duty in the erection of the Houses of Parliament, under Sir Charles Barry, as well as in several other large undertakings.

Fire Precautions.

The greatest care has been taken to have ample means at hand for the prompt extinction of that enemy which is common to all buildings, and of whose ravages we have recently had such fearful examples—fire. Water under pressure has been laid on to every part of the building, and there will be no less than 80 hydrants evenly distributed throughout. The water is supplied by the West Middlesex Water Company, and will have a head varying from 200 to 100 feet. A nine-inch main traverses the building from west to east, and from it 4-in. branch pipes are led in all directions to supply the hydrants. This is sufficient to throw any amount of water on to the roof flats, on top of which there will be portable fire-engines, to pump water on to the nave roof. As in 1851, there will, of course, be a trained body of men always on the spot to attend to all arrangements for working the hydrants, hoses, and engines; so that if, unfortunately, a fire should occur, a few minutes will suffice to bring a powerful column of water against any point.

Before concluding, I desire to impress upon the meeting that, although the building provides for the wants of the Exhibition in a better way than any other similar structure hitherto has done, my prejudice in favour of a brother officer's work must not prevent me from stating candidly, that very much remains to be done to render it a complete and permanent edifice. I believe that no building in the world, 24½ acres in extent, has ever been erected at so low a liability as £200,000, or capable of being sold for £430,000. It is only at the rate of twopence per cubic foot, whilst the rate for first-class dwelling-houses is 1s. 4d. The Houses of Parliament cost 3s. per cubic foot, and ordinary public buildings generally may be taken at from a shilling to ninepence per cubic foot. It is not necessary to point out how unreasonable are the animadversions on this building, where economy has reigned paramount, in expecting that £1 shall do as much as £6 or £8 in other cases. The building can be viewed only as an utilitarian structure for the present. When the Exhibition has succeeded, and the guarantors are free to deal with a surplus —when the Society of Arts becomes the proprietor of the whole, as it is already, virtually, of a large portion of the Cromwell-road front—then, I venture to hope, this Society will be proud of its property, and have the means, as well as the desire, to render it, both inside and outside, a complete building, worthy of being the home of International Exhibitions for future generations.

DISCUSSION.

Mr. Henry Ottley begged to ask one question, and to offer a few brief remarks. As this building was intended to be permanent and to commemorate the genius of this country to all time; as, moreover, it was intended to challenge the criticism of the artists of Europe, he wished to learn, for his own information and that of others, whether (seeing that no fewer than 280 plans were sent in by architects for the building for the Exhibition of 1851,) before proceeding to the erection of the present building, any architect in this country was invited to send in plans for that structure, or whether, in the course of the construction of the building, any architect had been invited to give advice or co-operation in the matter. Captain Phillpotts had described, in eloquent terms, the architectural features of the building; and with reference to the south front, in the Cromwell-road, he stated that certain ignorant persons had represented to the public that the domes, which were considered the most beautiful features of the building, were not to be seen from the south front. He (Mr. Ottley) felt himself personally involved in that matter of ignorance. He was the means of giving some information to the public through the *Illustrated London News* as to the intended Exhibition building, and he took pains, as far as possible, to obtain correct information as to what the building would be. Not only did he obtain the services of the artists of that journal, but he was permitted to examine the drawings in the rooms of the Royal Commissioners. On inspecting those drawings he saw represented a very wide front, with two domes, one on each side; but, calculating from the plan of the building, he discovered that these domes could not be seen within a distance of 100 or 150 yards from the front of the building; therefore the including those domes as part of the building in the drawing exhibited in the room, was a false representation of the building. He stated that fact in the newspaper he had referred to, and therefore he was not one of those ignorant persons who had misrepresented the thing. He begged to ask Capt. Phillpotts from what position he obtained the view representing one of the domes as shown in the drawing before them. That drawing was a very pretty thing to show to a meeting, or to circulate in papers. It was fortunate that the artist was not restricted to the narrow point of view to be obtained from a street 60 or 80 feet wide, in which alone the south front could be seen. The view now represented must have been taken before the houses were erected, or from the top of one of the houses. In either case he submitted it was not a fair representation to put before the public.

Mr. Donald said he thought it was a great pity that the view did not include the houses on the opposite side, which would have made it complete. The trees in the drawing were purely ideal.

Mr. Dunn would, in the first place, tender his thanks to Captain Phillpotts for his paper, which gave them a great deal of information which they did not possess before, and he for one was very glad to receive it. He begged to put a few questions, with the assurance that he did so not from any unfriendly spirit, but solely from a desire to obtain information on those points. He would ask first—how were Captain Fowke's designs chosen?—that was to say, what number of designs (if any) were sent in besides his, and under what circumstances were his designs selected? What had been paid for those designs, and what further sum was still to be paid? What time was allowed to the various parties to make their tender for the building? How many persons did tender, and what was the nature of their tenders? Under what circumstances was the tender of the present contractors accepted? Was it true that, owing to wrong calculations as to the strength of various parts of the building, those parts had been strengthened; and under what circumstances had they been strengthened? Those questions had been brought before him in various ways; and, judging from the manner in which the contract was let, added to the questions raised in the letter of Sir Joseph Paxton on the same subject, people were led to think of these things, and he for one should be glad to have a little more information upon them.

Mr. W. N. **Wilson** said he doubted whether it was within the province of this meeting to discuss arrangements which were not those of the Society of Arts, but entirely those of the Royal Commissioners with regard to this building. It appeared to him, however much they might, as a society or a body of the public, or as a number of architects, be interested in the manner in which this building might have been originated, in the plans adopted, and in the mode in which the tenders were accepted, yet it appeared to him that these were matters which were entirely beyond their control, and therefore he thought the discussion of those subjects was quite superfluous, and could lead to no useful result. The only effect of such a discussion he thought would be to raise jealous feelings in the minds of some who no doubt would have liked, and were probably quite competent to take part in the preparation of plans as well as in the making of contracts; but he felt they could arrive at no good result from the discussion of those subjects. They must look at the thing as a *fait accompli*. It was, he apprehended, quite open to them to take the plans, and where they discovered faults, it was competent for them to point them out, and if they discovered merits to eulogise them. Having visited the building last Saturday, and having seen those of 1851 and 1855, he would say he was not a little pleased with all he saw in the structure now in course of erection. There was much to be astonished at—first, as to the great amount of work already done; and, secondly, as to the great amount of work still to be done, and which, he was sangine enough to believe, would be completed by the time specified, and that the Exhibition itself would be —what he was sure they all heartily wished it might be —a great success. With reference to the drawing of the south front of the building, to which exception had been taken by the preceding speakers, he would say that the artist might have taken some little poetical license. It was a common thing to make pictures look as artistic and as pleasing as possible, and he thought there was no particular objection against the introduction of a few trees in the foreground. The building itself presented two or three features of great interest, which they must highly appreciate. The only thing he considered to be wanting was additional strength in the annexes, and he should be glad to hear from Capt. Phillpotts whether sufficient calculation had been made as to the strength required for the putting up of shafting to drive the ponderous machinery alluded to in the paper. As a mechanic, he (Mr. Wilson) had some doubts on the subject. His impression at the time of viewing the building was that they should have none of those magnificent effects which they had in the Exhibition of 1851, but that impression had been modified by the explanation that these effects would be obtained from the domes at the eastern and western entrances. He repeated that he had no doubt as to the entire success of the approaching Exhibition; and in the tournament of arts and manufactures he did not believe this country would be behindhand, particularly in all those matters which appertain to our great commercial interests.

Mr. **Henry Cole**, C.B., said the gentleman who spoke first had inquired if any architect had been consulted in the preparation of the plans for this building. He came prepared to hear that question asked, and in return he would ask that gentleman to have the kindness to define what an architect is. He had taken some pains to find out, and he confessed himself rather puzzled. He had gone to past times, in order to ascertain who had built some of the most striking buildings in Europe, and to find out whether they were or were not architects in the sense in which the term was understood. He would pass over some of those buildings and builders rapidly, in order that the gentleman might satisfy himself whether or not they were built by architects. In the first place, they had the exquisite belfry of Giotti, at Florence, who was bred a shepherd, and became a painter, and subsequently an architect, but he found no facts to substantiate that he was brought up professionally as an "architect." He next took Brunelleschi, the inventor of domes, who was originally a goldsmith; after that a sculptor, then a painter. He then became enamoured of construction, and as a self-taught architect built the dome of Florence, the constructive principles of which were adopted by Michael Angelo in St. Peter's at Rome. He had never heard that Michael Angelo himself was ever articled in a professional architect's office. He began his career as a sculptor, was eminent as a painter, and subsequently took up with architecture and military engineering. Bramanti, he dared say, had been heard of. He began as a painter, and subsequently erected a great part of the Vatican; hence he had been called an "architect." Leonardo da Vinci was in the first instance eminent as a mathematician, then as a modeller, then became a painter; subsequently he wrote some poetry, and afterwards became a water and military engineer, and in the latter capacity defended a number of the strong posts of Italy. Subsequently he erected a number of buildings, and became what was called an "architect." Palladio —a name which he had no doubt heard of—began as a geometrician; he never heard that he served his time to an architect; he had no systematic education in that profession, and yet he erected buildings which made him renowned. San Gallo, another eminent constructor, began as a sculptor, and subsequently became an "architect." He supposed the questioner had also heard the name of Inigo Jones; he began as a carpenter, afterwards he became a landscape painter, and met with patrons who sent him to Italy, where he turned his carpentering to good account, learned to erect buildings, and became an "architect." They had all heard the name of Wren. He (Mr. Cole,) should like to challenge anybody to show that he was an architect in the sense in which they understood it. He was very ingenious in making mechanical toys. He was a professor of mathematics at the University of Oxford. He happened to be acquainted with the Crown Surveyor of the time, who, having got into difficulties with a building under his charge, consulted Wren, and Wren, not being a professional architect, gave him sound advice, which led to his stepping into the place of his friend, and he erected St. Paul's Cathedral against much architectural advice; hence posterity called him an "architect," and it was commonly supposed that he was well entitled to that appellation. Then there was another person following him—Vanbrugh. They knew that he covered England with a great number of buildings, but he had no professional education as an architect. However, some people thought that he had a special genius for building. He built Castle Howard, Blenheim, and other mansions. The next most eminent name that occurred to him—coming now to modern times—was that of Sir Charles Barry, for whose talent he had much respect. Now he fancied that Sir Charles was what is called real professionally-bred architect. Sir Charles Barry's works they all knew; as to whether or not his Houses of Parliament were a great success the world was divided in opinion; some thought them all wrong; others thought them approximating to right. But of this point there could be no question,—having been deputed to build Houses of Parliament, in which people should be able especially to hear, and talk, or parley, he did not succeed in making rooms in which people could hear fairly well, if at all. Sir Charles Barry was also deputed to make a picture gallery for Lord Ellesmere. He had made a pretty architectural building, but unluckily not a picture gallery, as neither by day nor by night could the pictures in it be well seen. He was, however, an eminent professional architect, and notwithstanding his great reputation, the military engineer whose construction was now before them had been consulted how to make Sir Charles Barry's picture gallery suitable for the purposes for which it was designed. When it was decided what was an "architect," he (Mr. Cole) would answer the other questions which had been put by the same gentleman, who did not appear to know the difference between a perspective drawing and a geometrical elevation. That gentleman inquired if any architect had been consulted. Not using the term as meaning men who were great sculptors, painters, engineers, or constructors, but gentlemen who had served a certain amount of apprenticeship in an architect's office, he believed none of the latter were consulted with reference to the plans of the building now in course of erection at Kensington. They were, however, very largely consulted in 1851, and owing to the amount of time consumed in those consultations, the Exhibition was nearly rendered impossible. In 1850 the whole world was invited to send in plans for the building, and no fewer than 280 designs were sent in. A building committee of six of the most eminent men of the day was appointed to make a selection from these designs. Sir Charles Barry, Mr. Cockerell, and Mr. Donaldson formed the architectural secction of that committee, whilst the late Mr. Robert Stephenson, Mr. Brunel, and Sir William Cubitt composed the engineering section. These gentlemen were elected a building committee, to see what they could do with these 280 plans. They sat upon these designs for seven months; at last, they came to a conclusion that none of them were suitable for the purposes of the Exhibition. They then made, or caused to be made, a design of their own. These six gentlemen, somehow or other, by a process which he knew, but would not detail, prepared a design of which a drawing was now on the walls, and he should be glad if it could be raised up to a position in the room where it could be appreciated. At last, three most eminent architects and the three best engineers of the day, published plans and a design, and there it was. [The display of the design occasioned considerable merriment.] That (continued Mr. Cole) was the design which came out of the brains of 280 gentlemen of all Europe, hatched by the united ability of six of the most eminent architects and engineers this country afforded. They had only to refer to the records of Parliament to know how it was received. The question came incidentally before the House of Commons, and a division was taken whether that design should be erected in Hyde-park or not. Parliament, the press, and the whole country, was saying, "On no account let us have that design, and don't cut up the park with a brick and mortar erection." He happened to sit, during that debate, by the side of Sir Charles Barry, who said, "Don't think that is my design, I wash my hands of it." Afterwards he met one of the engineering members of the committee in the lobby, who said, "Don't hold me responsible for that design." The day following he met another, who said, "I have nothing to do with it." In fact, every one of those six gentlemen who were supposed to have anything to do with that design repudiated any responsibility with regard to it. The result was, as they were aware, that at the eleventh hour Sir Joseph Paxton came forward with a design, but nobody would venture to say that gentleman was a professional "architect." At a period when it was doubtful if Hyde-park would be used or not, and if a suitable design could be furnished by any architect, Sir Joseph Paxton came forward with his glass conservatory. His proposal was adopted, carried out with brilliant success, and it certainly was highly conducive to the success of the Exhibition. Now, instead of the wisdom of 280 gentlemen ready to contribute their brains in competition from all Europe, instead of the six eminent architects and engineers who acted as the committee, the Exhibition building of 1851 was designed by a gentleman who was known as a horticulturist. They must all admit his was a highly successful building. It got the Commissioners out of difficulty, and everyone was rejoiced now to find it re-erected at Sydenham, but it was not the work of any professional architect. Capt. Fowke, who had the highest constructive ability—amounting to genius—had been employed as Secretary to the Paris Exhibition. He had built the National Gallery at Dublin, and designed the Industrial Museum of Scotland; he had also been employed in laying out the ground plan of the Royal Horticultural Society at Kensington. That ground, almost from its first purchase, was viewed as providing a home for future exhibitions. Nothing, therefore, was more natural than that in laying out the ground he should have made provision for the site of the future Exhibition. Accordingly, when the Royal Commissioners for 1862 entered upon their functions, Capt. Fowke had plans ready. He (Mr. Cole) supposed the most partial advocates of architects and competition would not contend that the process of 1851 ought to have been repeated as regarded the building for 1862. Was all Europe to be again invited? Were seven months to be lost? Was a building committee of the most eminent architects and engineers to be again appointed, to end in another horticulturist coming forward with another Crystal Palace? He should say that, having gone through that amount of experience with competition amongst architects, a different lesson was taught. On the contrary, having a proposed building which answered the purposes admirably—having no time nor money to lose—common sense said adopt it. He would briefly state what this building would be. He would challenge any architect—English or foreign—ever to have erected such a satisfactory picture gallery as would next year be shown to the whole of Europe. The gentleman who spoke first alluded to his connection with the *Illustrated London News*, and he (Mr. Cole) saw in that paper a most comical question asked about picture galleries. Somebody had asserted that picture galleries should be lighted from the top; so the *Illustrated London News* said, thereupon, "What a monotony! Why not light from the sides? How pleasant it would be to look out of the windows." But that was not the suitable thing for pictures. If they wanted to exhibit pictures they must have walls on which to hang them, and special means of lighting to show them. It might be very pleasant to look out of the windows, but he did not think, in this case, to look out upon the building called "the Boilers" would be a particularly pleasing picture, and worth the sacrifice of hanging space. At all events he only wanted to bring either the *Illustrated London News* or its representative there present to the fact that if they wanted a picture gallery they must have walls to hang the pictures on, and common sense said they ought to light a picture gallery so that the pictures could be seen. He put forth his challenge with unhesitating confidence, that no architect had ever yet erected a picture gallery in this country or in Europe which would match that of Captain Fowke next year; and he ventured to say that the whole of Europe would pronounce that gallery to be the finest ever seen. That was what a military engineer would do—a gentleman who, according to the precedents he had shown, was no architect. Further than that, they would have a building which would not leak, as a glass building must more or less. He was a great admirer of the Crystal Palace, but he confessed it was a building which he looked upon in the light of a conservatory; to talk of it as a building suitable for all other purposes he thought was going too far. It could not be suitable for a picture gallery, for the directors had made one within it. In the present building they would have a space in the nave exceedingly well lighted, but from the sides. By the bye, he was not sure whether the *Illustrated London News* did not object to a northern light. Now, as artists were in the habit of paying large sums to procure a northern light, it was odd to object to it. He could go through all the different points of objection taken, and answer them, but he should weary the meeting by so doing. He would conclude by saying this—having had some experience in the Exhibition of 1851, having had something to do with the Paris Exhibition, and having observed the construction of the present building, he would say if the guarantors and Commissioners desired to have a building which should be a common-sense building, and not to outrun the constable as to expense—which had been the case with some public buildings—if they wanted a thing treated according to the principles of common sense, fulfilling the objects for which it was intended—they would have in the building next year those objects realised to a greater extent than had been the case in any Exhibition building which had ever yet been erected.

Mr. Ottley claimed to reply to the observations of Mr. Cole, but the Chairman ruled he was out of order.

Mr. Marsh Nelson suggested the adjournment of the discussion, in order to give the members an opportunity of examining the plans and drawings, and also to give an occasion on which to reply to the very ingenious speech of Mr. Cole. He was but a humble member of the profession of architects, but as Mr. Cole had thought proper to vilify that body, he should move an adjournment of the discussion, even if the Chairman had not ruled as he had done, which ruling he thought exceedingly unfair.

The Chairman threw himself upon the protection of the meeting.

Mr. Nelson (amidst loud cries of order) proceeded to remark that the Society would not perform its duty unless it afforded full opportunity for the discussion of so important a subject as this, which he contended ought not to be passed over in a single evening. An additional reason for an adjournment, he submitted, was offered by the fact of the unfavourable state of the weather on Saturday last for properly viewing the building.

Sir Thomas Phillips (Chairman of the Council) would address a few observations to the meeting, because he could not help thinking they had forgotten, to some extent, the object the Council had in view in presenting to the Members a description of the building for the Exhibition of 1862. Any fair criticism of the building itself would be a perfectly legitimate subject for the meeting, but they had no right to sit in judgment upon the acts of gentlemen who were not before them, viz: the Royal Commissioners for 1862. Let it be remembered that those gentlemen had undertaken an extremely onerous, an extremely anxious, and an extremely difficult duty, at the request of this Society; they were a body called into existence by the Society itself—that selection having been concurred in by the numerous persons who had joined in the guarantee fund. Those gentlemen had undertaken the duties of Commissioners for the Exhibition of 1862, and they had done so upon the thorough understanding that they were to be absolute—that they were themselves to be the sole judges of the course to be taken; and it would never do for the Society now to set themselves up as judges over those to whom they had delegated such absolute power, and to express opinions unfavorable to the course they were pursuing. The Council of the Society simply desired to present to the members a description of the building for the Exhibition of 1862. It was thought it would be interesting to them to know all that was being done to carry out that great enterprise, but it would never do for the Society to say to the Commissioners: "You ought to have pursued a different course; you ought to have invited competition in the plans for the building; and you ought not to have entrusted Captain Fowke with the execution of the works." The Royal Commissioners were not before them in any way. The motives for their conduct they knew not. The paper read that evening had not been prepared at their request, nor was he aware that it had been done with their knowledge. But it was the desire of the Council to bring before the meeting an accurate description of the building, to show them what preparation had been made for the approaching Exhibition, and to give them an opportunity, if they pleased, of criticising the building itself. The Council were aware that they opened this question of the merits of the building, but he would ask the meeting, in justice to men who were not present—in justice to men who could not be heard—in justice to men who might say, "We have been called into action by yourselves; you must have considered that we were fit men to be entrusted with the duty; we have endeavoured to discharge that duty honestly, anxiously, and carefully, and we are not now before you to have an opinion expressed upon our conduct;" in justice to those gentlemen, he asked them to take a course which the position of the Society, in connection with this undertaking, should lead them to take. He trusted they would feel that to convey an implied censure upon the proceedings of the Commissioners was a thing they ought not to do; and he would ask them to limit the discussion to its legitimate object and scope, viz., the consideration of the building which had been explained to them.

Mr. Sowerby agreed with Sir Thomas Phillips, that they had departed from the proper object to be discussed. The thing to be considered was the merits or demerits of the building itself. With regard to the Exhibition of 1851, he was present when that building was discussed before the Institution of Civil Engineers, but they must remember that there was a great difference between the Exhibition of 1851 and that of 1862, inasmuch as, at the former period the whole question was a novelty, and it was difficult to hit upon a design to suit such a purpose. He was amongst the visitors to the building on Saturday, and his first impression was that it was not equal to that of 1851, and he thought it would have been well if the Council had called upon the architects of this and other countries to supply designs for the building of 1862. If that had been done he had no doubt a great improvement would have been shown over the designs of 1851, particularly as to mechanical contrivances and appliances.

Vice-Chancellor Sir Wm. Page Wood, F.R.S., said, the period had now arrived for proposing a vote of thanks to Captain Phillpotts for his paper, for the large amount of information he had communicated, and for the great delight which had been afforded to most present. Whatever difference of opinion existed as to whether or not it was possible that a better building could have been designed, they should at all events have a building well fitted for the purposes for which it had been constructed—a building a portion of which would be permanent, and which, therefore, could not be brought into comparison with the building of 1851, which was never intended to be permanent. They would also have that building constructed in a very short space of time, and at what seemed to him an inconceivably small amount of expense, when they saw the extent of the building itself, and the very handsome and ornamental features which existed in the two domes, themselves of dimensions such as had never yet been erected in any part of the civilised world. At that late hour of the evening he should be very brief in proposing a vote of thanks to the gallant captain for his able paper; but he could not sit down after the painful observations which had been made with reference to the decision from the chair, without bearing witness, as one who had sat for some time in the House of Commons, that it was a thing unheard of in public debate for any person to address a meeting twice, except the proposer of the original motion, who had a right to reply.

Mr. Nelson said that an explanation was allowed.

Sir W. Page Wood.—The only explanation allowed was this—if a speaker was stated by any person who answered him to have said something which he did not say, he had a right to get up and say, "I did not say that," and that was all the reply he could make; and though it was unpleasant—and he had himself suffered it—to get up in the House of Commons and make a speech, and afterwards hear one's arguments twisted all manner of ways, and, as it might be thought, perverted—yet, if the reply fell short of making a speaker say anything he did not say, then he must sit still and bear it, without the possibility of making a counter statement. It was obvious if there was no such rule of debate they might sit there an unlimited time. He felt it due to the chairman to state this, because in no assembly had he ever heard it said that the gentleman presiding was unfair in the decision he gave. That was a remark which ought never to be made, and he had never before heard it in any meeting of any description. Having thought it just and right to make these few observations with reference to the chairman's decision—which he submitted was not only fair, but if he might be allowed to say so, was the only consistent one that could be given, he now came to the more pleasing duty of saying that he was sure the meeting would be unanimous in agreeing that they were extremely indebted to the gallant captain who had afforded them this information. He must have taken great pains to prepare such a paper, and he had shown great ability in rendering details of a somewhat dry character explicit, and in many respects interesting. Those who had not yet seen the building would have the advantage of doing so with the accompaniment of these explanations, and after that description would understand it better then they would otherwise have done. He begged to propose that the thanks of the meeting be tendered to Capt. Phillpott for the very able paper with which he had favoured them.

Mr. William Hawes had great pleasure in seconding the vote of thanks which had been proposed by Sir W. Page Wood. He thought it necessary to call the meeting back to the object for which it had assembled. They were there simply to receive from Captain Phillpotts that kind of explanation which was necessary to complete the information which they gathered from an inspection of the building last Saturday. This paper followed that inspection, and was meant to supply these matters of detail which they could not obtain on the spot, and to enable them, with the paper before them, to understand the peculiar mode of construction and the enormous strength that was gained by very simple mechanical means. He regarded this building, not so much as an architectural structure or beautiful design, but as coming near to perfection in suitability for the object for which it was intended, and he believed it would be an entire success in placing before the visitors, in the best manner, not only the arts of this and other countries, but their manufactures and the results of their commerce. It was not to be looked at as an architectural building, for it had no pretensions to be such. No building rapidly erected as this was could have that pretension; but it had the pretension of being a building well adapted to the purposes for which it was to be employed. If that were the case, they, as a Society, ought to feel that they had promoted a great object. At the former meeting they had laid before them the principles on which this International Exhibition was based; they had now been favoured with a comprehensive explanation of the building, and he hoped that other papers on subjects relating to the Exhibition would be forthcoming during the Session.

The Chevalier De Schwarz (Austrian Commissioner), said, having been appointed Commissioner for several International Exhibitions since 1845, and having seen all the buildings devoted to those purposes on the continent, as well as that in this country in 1851, he had great pleasure in expressing his opinion that the building now in course of erection would admirably suit the purpose for which it was intended, and would give universal satisfaction to the foreign exhibitors.

Mr. Chas. Asprey remarked, that it struck him the greatest misfortune of the evening, had been the attempt to answer the questions with regard to what the Royal Commissioners had done, and were doing. It appeared to him that they had one conclusive answer to those enquiries: that was in the extraordinary amount of money that had been guaranteed—nearly half a million being placed at the disposal of the Commissioners, showing that the guarantors themselves had the greatest confidence in what they were about to do. If that answer had been given at first, it would have spared much of the discussion and warmth of feeling that had occurred.

Mr. Murchison thought there had been too much wish to control the discussion. This was an elaborate paper the reading of which occupied more than an hour, whilst they had scarcely had three-quarters of an hour's discussion upon it. He thought, seeing the large amoun of interest which the subject had excited, it would only have been an act of courtesy to the author that this discussion should be adjourned to a future evening. He rose for the purpose of making a remark which struck him in the course of this discussion. As one of the oldest members of the Society, he ventured to say that its object was the encouragement of Arts, Manufactures, and Commerce, and the mode in which they had afforded that encouragement hitherto had been by throwing open to the competition of the whole nation such objects as they considered ought to be promoted, and were worthy of the attention of scientific persons; and therefore he thought, on an occasion like this, when they were about to raise a structure which was to attract the whole universe to one spot, it would have been a noble opportunity for the Society of Arts to have exercised that principle which had been at the foundation of its prosperity—to have invited tenders for the erection of the building, as well as designs for its construction. They had been told by Mr. Cole that Captain Fowke had gained considerable experience in these matters from his connection with the Paris Exhibition, as well as with the Royal Horticultural Society in laying out their grounds at Kensington. In like manner it was to be inferred that from the more frequent recurrence of these exhibitions, the designs that would have been sent in for the building would have been of a very superior character to those of 1851.

Mr. Winkworth rose to order.

The Chairman said, a little latitude had been allowed in permitting gentlemen to speak after the vote of thanks had been proposed, but this must have its limits. He should be happy to hear the remarks of Mr. Murchison upon the question of the vote of thanks, the discussion upon the general subject having been closed.

Mr. Murchison said he was speaking in support of the motion now before the meeting, and took that opportunity of expressing his feelings as to what he considered to be the duty of the Society on such an occasion as this.

The Chairman then put the question of a vote of thanks to Captain Phillpotts for his paper, which was carried unanimously.

The paper was illustrated by a large number of plans, drawings, photographs, and models.

The Secretary announced that on Wednesday next, the 11th December, a paper by Mr. Thomas Baker, "On Railway Management, from the Passenger's Point of View," would be read.

MEETINGS FOR THE ENSUING WEEK.

Mon. ...R. Geographical, 8½. Latest Explorations in Africa, by Livingstone and May, Speke and Grant, Petherick, Peney, &c.

Medical, 8½. Dr. Cockle, "On some points connected with the Past and Present History of Diabetes; and on a less common form of death in this disease."

Tues. ...Civil Engineers, 8. Discussion upon Mr. Bailey Denton's paper, "On the Discharge of Underdrainage, and its Effect on the Arterial Channels and Outfalls of the Country."
R. Medical and Chirurgical, 8½.
Syro-Egyptian, 7½. 1. Mr. Samuel Sharpe, "Three Petitions from a Religious Recluse in the Temple of Serapis, in Memphis, addressed to Ptolemy Philometer." 2. Mr. C. E. Harle and Dr. Hincks, "On an Assyrian Cylinder in the British Museum."
Zoological, 9.
Wed. ...Society of Arts, 8. Mr. Thomas Baker, "On Railway Management, from the Traveller's Point of View."
R. Soc. Literature, 4½.
Thurs...Antiquaries, 8½.
Royal, 8½.
Philological, 8.
Fri. ......Astronomical, 8.
Sat. ......R. Asiatic, 3.
[illegible] Botanic, 3¾.

PATENT LAW AMENDMENT ACT.

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APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, November 29th*, 1861.]

Dated 10th August, 1861.

1999. M. Wigzell, Friars-green, Exeter—Imp. in machinery or apparatus for making plain twisted nails, spiral fluted nails, and other similar driving articles of a twisted or spiral fluted form throughout or in part.

Dated 19th September, 1861.

2333. L. G. A. Condroy, Donai, France—An improved centrifugal apparatus, intended for purifying, washing, drying, moulding, or extracting from liquids, substances or materials of various kinds, which are deposited or poured for this purpose in moveable baskets or boxes fitted in the said apparatus.

Dated 3rd October, 1861.

2466. T. Warwick, Birmingham—An imp. in the manufacture of umbrellas and parasols, and imp. in machinery to be used in the manufacture of umbrellas and parasols. (Partly a com.)

Dated 18th October, 1861.

2596. J. Lawson and H. Carter, Royal Artillery, Woolwich—Imp. in metal musical wind instruments.

Dated 21st October, 1861.

2625. F. A. Calvert, Manchester—Imp. in engines to be propelled by compressed atmospheric air or steam.
2628. F. Fenton, Fishguard, Pembrokeshire——Imp. in obtaining and treating fibrous substances.

Dated 23rd October, 1861.

2647. J. W. Wilson, Barnsley, Yorkshire—Imp. in machinery for digging and cultivating the soil, and in steam engines connected therewith, and for other agricultural purposes.

Dated 1st November, 1861.

2735. G. Holcroft, Manchester—Imp. in the construction of blast furnaces for smelting ores.
2736. L. Thomas, 9, Union-street, Berkeley-square—Imp. in rifled ordnance and projectiles.
2737. D. Lang, 26, Skinner-street, Snow-hill—Improved moulded india-rubber boots, shoes, and other like articles. (A com.)
2750. W. B. Smith, Camborne, and W. Bennett, Tucking-mill, Cornwall—Imp. in the method of and apparatus for preventing the injurious effects occasioned by smoke, sulphur, and the deleterious gases which escape from stacks, chimneys, calcining houses, chemical and other furnaces.

Dated 4th November, 1861.

2765. J. C. Anderson, 2, Portland-place, Sumner-road, Croydon—Imp. in apparatus for projecting cricket balls wlth accuracy.
2770. W. T. Weston, 4, Trafalgar-square—An improved spring and fastening applicable to gates, doors, and other useful purposes.

Dated 6th November, 1861.

2790. F. G. Stuber, 1, St. James's-road, Brixton—An improved hygrometer for measuring the humidity of the atmosphere, dampness of beds, garments, and for other similar purposes.

Dated 7th November, 1861.

2794. A. W. Williamson, University College, Gower-street—Imp. in the construction of steam boilers.

Dated 8th November, 1861.

2802. T. C. Darby, Little Waltham, Essex—Imp. in the construction of horse hoes.

Dated 13th November, 1861.

2856. J. Vaughan, Birmingham—An imp. or imps. in the manufacture of bayonets, and in apparatus or machinery to be employed therein.
2864. J. Leslie, 60, Conduit-street, Hanover-square—Imp. in the manufacture of gas.

Dated 14th November, 1861.

2866. A. O. Lipsett, Manchester—Imp. in apparatus for heating or boiling fluids for domestic or other purposes.
2868. W. Heap, Ashton-under-Lyne—An improved instrument for cutting pipes and bars of metal.
2870. R. Heath, 25, St. George's-place, Hyde-park-corner—An imp. in umbrellas or parasols.
2872. G. Hawksley, Three Mill-lane, Bromley-by-Bow—Imp. in apparatus for sounding alarums and actuating ventilators.

Dated 15th November, 1861.

2874. C. H. Minchin, Manchester—Imp. in ventilators for railway and other carriages, and for other similar purposes.
2876. J. Spratt, Camden-road-villas, Camden-town—Imp. in the preparation of food for hogs, dogs, cats, and poultry, and in apparatus for the same.
2878. W. E. Newton, 66, Chancery-lane—Imp. in steam engine governors. (A com.)
2880. W. Staufen, 84, London-road, Sonthwark—Imp. in the manufacture of brushes, and in preparing certain vegetable fibre for such and other uses.

Invention with Complete Specification Filed.

2940. M. Henry, 84, Fleet-street—Improved means of rendering steam-tight the opening for the passage of the piston rod through the cylinder cover in steam engines, which means are applicable also to other parts of steam engines, and parts of other engines, machines, and apparatus for the rendering thereof steam tight and fluid tight. (A com.)

Patents Sealed.

[*From Gazette, November 29th*, 1861.]

November 28th.
20. T. Cobley.
1387. W. R. Jeune.
1389. J. Towl.
1411. E. C. Stanford.
1430. S. Hawkins.
1432. W. O. Johnston.
1437. J. Platt and W. Richardson.
1439. J. Platt and W. Richardson.
1441. J. Vaughan.
1457. H. Du Mont.
1469. W. Clark.
1481. J. Steart.
1487. F. E. Schneider.
1553. A. R. Le Mire de Normandy.
1577. P. Pradel.
1617. H. B. Barlow.
1630. W. Holland.
1638. S. A. Bell.
1977. A. V. Newton.
1987. A. V. Newton.
2184. T. S. Stock, J. S. Stock, and H. Taylor.
2277. G. C. Haseler.
2325. W. Cory, jun.

[*From Gazette, December 3rd*, 1861.]

1388. G. B. V. Arbuckle.
1395. S. Hargreaves, R. Holden, and H. Holt.
1397. A. Prince.
1399. D. W. Thomas.
1400. W. R. Floyd.
1402. J. L. Hancock and F. L. Hancock.
1403. J. H. Holdsworth.
1407. S. Standfast.
1408. J. A. Van Braam.
1409. J. A. Williams.
1415. F. J. Manceaux.
1418. D. Nickols.
1420. H. T. Coles.
1421. L. J. P. de Mirimonde.
1427. T. Hamilton and J. Hamilton.
1442. R. Harlow.
1447. W. Wood.
1448. A. A. Croll.
1450. W. Leopard.
1452. C. W. Lancaster.
1453. J. F. Clarke.
1458. J. M. Worrall and T. Lawrence.
1463. P. O'Hanlon.
1465. J. Rymer.
1482. M. Hawdon.
1489. C. Stevens.
1503. J. A. Callaud.
1507. J. Watt.
1512. R. Jobson and C. F. Varley.
1519. E. Bing.
1531. P. Langlade.
1534. H. J. Kennard.
1541. T. Page.
1542. H. C. Simpson.
1546. J. Lewis.
1665. W. Clark.
1749. J. C. B. Salt.
1804. S. Tawell.
2500. W. Callcott.
2504. F. J. Evans.
2526. J. Schwartz.

Patents on which the Stamp Duty of £50 has been Paid, and Dates of their Production for Certificate.

[*From Gazette, November 29th*, 1861.]

November 25th.
2714. C. Hancock.
November 26th.
2746. G. W. Bales.
2839. G. F. Wilson.
2878. T. Moss.
November 27th.
2751. L. Bissell.

[*From Gazette, December 3rd*, 1861.]

November 28th.
2734. J. Coulson.
November 29th.
2757. W. Robertson and J. G. Orchar.
2892. J. J. Aston.
November 30th.
2722. R. Legg.

Patents on which the Stamp Duty of £100 has been Paid, and Dates of their Production for Certificate.

[*From Gazette, November 29th*, 1861.]

November 25th.
2494. W. Blundell.
November 26th.
2666. L. H. F. Melsens.
November 27th.
2519. J. Mason and L. Kaberry.

[*From Gazette, December 3rd*, 1861.]

November 29th.
2510. G. Gowland.